UNIVERSITY of GREENWICH | Natural Resources Institute

A guide to the analysis of fish marketing systems using a combination of sub-sector analysis and the sustainable livelihoods approach

A Guide to the Analysis of Fish Marketing Systems Using a Combination of Sub-sector Analysis and the Sustainable Livelihoods Approach

U. Kleih, P. Greenhalgh and N. Oudwater

Natural Resources Institute

DFID Department for International Development

PHFRP POST-HARVEST FISHERIES RESEARCH PROGRAMME

A Guide to the Analysis of Fish Marketing Systems Using a Combination of Sub-sector Analysis and the Sustainable Livelihoods Approach

U. Kleih, P. Greenhalgh and N. Oudwater

The Natural Resources Institute (NRI) of the University of Greenwich is an internationally recognized centre of expertise in research and consultancy in the environment and natural resources sector. The Institute carries out research and development and training to promote efficient management and use of renewable natural resources in support of sustainable livelihoods.

This publication is an output from a research project funded by the United Kingdom Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.
R7969 Post-Harvest Fisheries Research Programme

Natural Resources Institute
ISBN: 0 85954 522-0

University of Greenwich, a registered charity and company limited by guarantee, registered in England (Reg. No. 986729). Registered Office: Old Royal Naval College, Park Row, Greenwich, London SE10 9LS.

Contents

Abbreviations

CMS	Cirrus Management Services Pvt. Ltd, India
CODEC	Community Development Centre, Chittagong, Bangladesh
DFID	Department for International Development, UK
EU	European Union
HACCP	Hazard Analysis Critical Control Point
ICM	Integrated Coastal Management, India
IMM	Integrated Marine Management Ltd
MAPP	Morocco Agribusiness Promotion Project (MAPP)
MPEDA	Marine Products Export Development Authority, India
NGO	Non-Governmental Organization
NRI	Natural Resources Institute, University of Greenwich, UK
PHFRP	(DFID) Post-Harvest Fisheries Research Programme
PLA	Participatory Learning and Action
PPA	Participatory Poverty Assessment
PRA	Participatory Rural Appraisal
RMA	Rapid Market Appraisal
RRA	Rapid Rural Appraisal
SCP	Structure, Conduct, Performance model
SIFFS	South Indian Federation of Fishermen Societies
SLA	Sustainable Livelihoods Approach
SPS	Sanitary and Phytosanitary Standards
SUFER	Support for University Fisheries Education and Research, Dhaka, Bangladesh
UoC	University of Chittagong, Bangladesh
USAID	United States Agency for International Development

Acknowledgements

The authors would like to express their gratitude to their research partners who participated in the two projects from which this guide has been developed. Some of the case study material used in the guide has been borrowed from their project reports. Particular thanks are due to the members of the following organizations:

Cirrus Management Services Pvt Ltd (CMS), Bangalore, India
Community Development Centre (CODEC), Chittagong, Bangladesh
Integrated Coastal Management (ICM), Kakinada, India
Integrated Marine Management (IMM Ltd), Exeter, UK
South Indian Federation of Fishermen Societies (SIFFS), Trivandrum, India
University of Chittagong (UoC) Marketing and Sociology Departments, Bangladesh.

The authors are grateful to CODEC for providing the photographs used for the cover design of this publication.

In addition, the valuable information provided by Mr Ivor Clucas is gratefully acknowledged.

Last but not least, the authors would like to thank the DFID Post-Harvest Fisheries Research Programme for providing the funds for the preparation of this guide.

Introduction

Objective of the Guide

The objective of this guide is to provide the main elements that need to be considered when analysing a fish marketing chain from a livelihoods perspective. It is argued that a combination of the Sustainable Livelihoods Approach (SLA) and sub-sector analysis will deliver the most reliable results. The combination of the two approaches allows a clear focus on the main stakeholders involved in the commodity chain, emphasizing livelihoods aspects, but also employing more traditional methodologies.

Although the guide can be used for the analysis of any fish marketing chain in developing countries, the focus is on the marine fisheries sector. This is because the DFID-funded research projects, which were used for the compilation of this guide, mainly dealt with marine fish species.

The guide is primarily targeted at researchers and development practitioners investigating fisheries-based communities or sub-sectors with the intention of preparing project interventions or policy recommendations.

The report starts with background information on the two research projects in which the methodology was applied and tested. The SLA and sub-sector analysis are then presented independently before a discussion of how the two approaches can be combined, particularly if poverty alleviation is the ultimate objective of a study. The last section covers data collection and analysis, highlighting the main steps involved as well as tools and techniques. Additional material covering the case studies and the approaches adopted is presented in the Appendixes.

Background

The two projects primarily used for the compilation of this guide were both funded by the DFID Post-Harvest Fisheries Research Programme (PHFRP), and implemented in Bangladesh and India by the Natural Resources Institute (NRI) of the University of Greenwich in partnership with local collaborators.

The project 'R7969 Fish Distribution from Coastal Communities in Bangladesh: Market and Credit Access Issues' lasted from February 2001 to October 2002. The main partners included:

- Natural Resources Institute (NRI), University of Greenwich, UK
- Community Development Centre in Chittagong (CODEC)
- University of Chittagong (UoC) Marketing and Sociology Departments; this component was funded by the Dhaka-based DFID project 'Support for University Fisheries Education and Research (SUFER)'.

The ultimate goal of the project was to work towards poverty alleviation and livelihood security among coastal fishing communities and those involved in the distribution chain. The aim of this research project was to explore the dynamics of the livelihoods of the poor in the fish marketing chain in more detail and make recommendations regarding the development of fish marketing and livelihood sustainability.

Through the application of new knowledge, the project aimed to improve the post-harvest utilization of fish and its impact on the livelihoods of poor fisherfolk, processors, traders and consumers. The following project outputs have been produced:

- an improved understanding of the trading and credit system for fish produced in poor coastal communities
- a methodology integrating market and credit analysis techniques with a livelihoods approach in a post-harvest fisheries context
- policy suggestions originating from stakeholders and likely to benefit the poor in coastal fishing communities and the fish distribution chain in Bangladesh.

Although the following three main research areas were covered, it was not always possible to keep them completely separate.

(i) Analysis of the livelihoods systems of fishing communities. This started with an investigation of the capital assets available to the different wealth groups in the villages, and their vulnerability context. Other aspects included the institutional, social, cultural and political contexts, investigating, amongst other things, patronage relationships between traders and fishing communities, social relations between the various parties involved in the trading and credit network, and distribution of non-economic obligations and rights. In addition, poor fish producers' and traders' access to institutions affecting their livelihoods was emphasized.

(ii) Analysis of the marketing system. This included mapping of the sub-sector, calculation of costs and margins, assessment of the pricing mechanisms for the fish (both for the producers and consumers), risk factors, such as seasonality, evaluation of technical issues (e.g. post-harvest loss, increased necessity for food safety and quality control systems), identification of bottlenecks and opportunities.

(iii) Analysis of the credit system. This included an assessment of the inter-linkages between fish distribution and credit supply, possible market inefficiencies due to exploitative practices, access to formal and informal sources of credit by poor participants in the commodity chain, relative costs of credit, and the extent to which fishing communities may have been able to benefit from micro-credit programmes in Bangladesh.

The research project 'R7970 Globalization and Seafood Trade Legislation – The Impact on Poverty in India' which lasted from July 2001 to March 2003, sought to devise strategies and management systems to improve the post-harvest utilization of fish in ways that would make an impact on the lives of poor producers, processors, traders and consumers. It was part of the overall DFID programme to develop strategies and management systems with similar objectives.

Using a multi-disciplinary approach, the research undertaken by the project aimed to generate and disseminate new knowledge and develop a methodology to assess the impact of globalization and changing international food safety legislation on the livelihoods of the poor in the sector. In addition, policy recommendations were developed relating to people's livelihoods, poverty eradication and the global seafood market. The project targeted the poor and vulnerable in the fish processing and distribution chains, which included coastal and aquaculture fishing communities (e.g. fishermen, boat and net owners, small-scale processors, service providers, traders and distributors).

Four organizations were involved directly as partners in the project:

- Natural Resources Institute (NRI), University of Greenwich, UK
- Cirrus Management Services Pvt Ltd (CMS), Bangalore, India
- Integrated Coastal Management (ICM), Kakinada, India
- South Indian Federation of Fishermen Societies (SIFFS), Trivandrum, India.

Other related projects funded by DFID in India through PHFRP included:

- 'Changing Fish Utilization and its Impact on Poverty in India (ICM/IMM)'
- 'Field Evaluation of a Systems-based Approach to the Reduction of Blowfly Infestation of Traditionally Processed Fish in Tropical Developing Countries' (MD Associates).

Chapter 1

Overview of the Sustainable Livelihoods Approach[1]

Background

The Sustainable Livelihoods Approach (SLA) is a way of thinking about development that has evolved from lessons learned from poverty reduction approaches as experienced by international and national organizations such as DFID, CARE and OXFAM. Sustainable livelihoods is a framework for thinking about poverty by trying to understand and analyse the lives and needs of the poor and identify key opportunities that will ultimately benefit them. The SLA embraces a wider approach to people's livelihoods by looking beyond income generation activities in which people engage. Through participatory approaches, it seeks to encourage various stakeholders, with their own perspectives, to engage in these discussions and debate the factors affecting their livelihoods and possible opportunities. In sum, the SLA:

- involves a systematic analysis of poverty and its causes
- takes a holistic view of opportunities for improving people's livelihoods, the possible impact of such opportunities and how this fits within existing livelihoods, taking into account the constraints
- places people and their priorities at the centre.

Box 1: Definition of a 'sustainable livelihood'

A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Carney, 1998).

The SLA stresses the importance of an in-depth understanding of the various livelihood components and factors including:

- the priorities that people identify
- constraints and livelihood opportunities, varying from place to place, group to group and across income levels
- the different strategies that the poor adopt in pursuit of their priorities and in response to the constantly changing environment in which they live
- different social groups within a community often facing a variety of sources of risk in their livelihoods, and thus differing reasons for their vulnerability
- the institutions, policies and organizations that determine their access to assets/ opportunities and the returns they can achieve
- the access of the poor to social, human, natural, financial and physical capital and their ability to put these assets to productive use
- the changing context in which they live, for example, external trends (i.e. socio-economic and ecological), shocks (both natural and man-made) and seasonality.

(See also Ashley and Carney, 1999.)

[1] Based on: Carney (1998), Ashley and Carney (1999), DFID Sustainable Livelihoods Guidance Sheets, www.livelihoods.org and Oudwater (2001).

In the following sections, a brief summary is given of the main elements that make up the sustainable livelihoods framework (see Appendix 2 for a more detailed discussion). Following the key building blocks, a short overview is then provided on methodologies that can be used in applying the sustainable livelihoods principles.

The Key Elements of the Sustainable Livelihoods Framework

The key elements of the SLA framework are:

- capital assets: resources that help people survive and thrive (i.e. natural, social, human, physical and financial capital)
- vulnerability context: things to which the poor are vulnerable
- policies, institutions and processes (in earlier versions of the SLA this was referred to as 'structures and processes'): influencing their livelihoods
- livelihood strategies: how people adapt and plan in response to threats and opportunities
- livelihood outcomes and aspirations: people's objectives and priorities.

(See Figure 1)

Capital assets

Capital assets are resources that help people survive and thrive and include:

- natural capital (e.g. aquatic resources)
- human capital (e.g. fishing skills, physical health)
- social capital (e.g. social relations, informal safety networks)
- physical capital (e.g. available marketing infrastructure)
- financial capital (e.g. access to credit).

Assets are important in terms of quantity and quality. Another crucial question is how do men and women access assets and what is the extent of their control, rights and security of access. Although it is not always possible to define a 'minimum' level of assets needed for survival as the basic requirements differ from place to place, it is obvious that the better people's overall asset status is, the better they will be able to respond to changes and face hardships. Also it needs to be recognized that some capital assets can be negative (i.e. liabilities). A pentagon is sometimes used as a visual tool to present information about people's access to assets and the interrelationships between them.

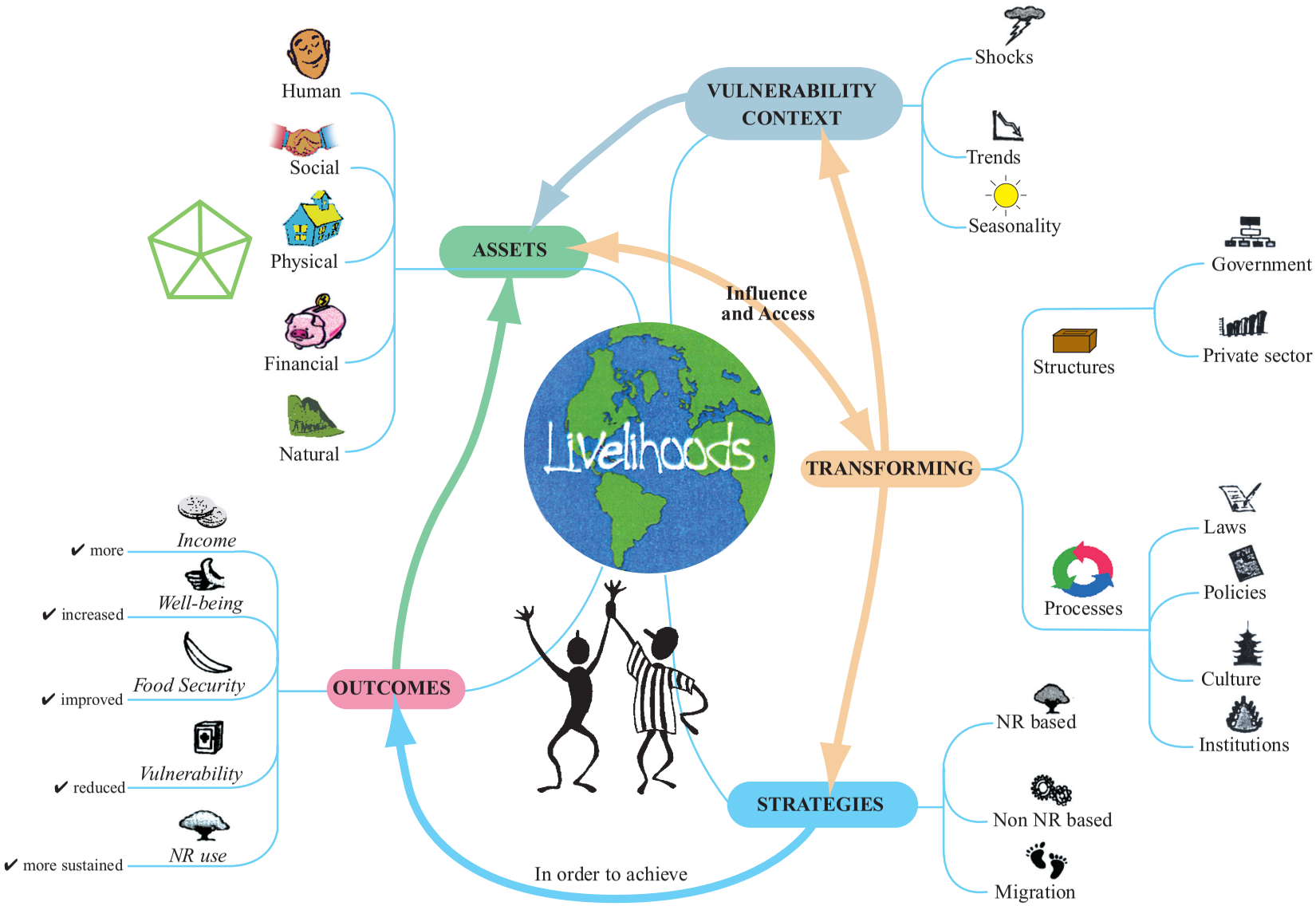
Vulnerability context

The factors that make up the vulnerability context are important because they have direct impact upon people's assets and options available to them in pursuit of beneficial livelihood outcomes (DFID Sustainable Livelihoods Guidance Sheets). Shocks, trends and seasonal shifts are the main concepts usually used to assess household vulnerability. Shocks include unpredictable events such as natural disasters (e.g. cyclones, floods, earthquakes), economic shocks (e.g. sudden change in the marketing system) or conflict. Trends are changes over a longer period of time (e.g. declining fish stocks, national and international economic trends or technological trends). Seasonality is related to phenomena such as price fluctuations, fish catching seasons or food availability.

Although the use of the term 'vulnerability context' highlights the fact that the related influences are often the direct or indirect causes of household poverty, it is also worthwhile noting that not all trends or shocks are negative or cause vulnerability (e.g. economic indicators may move in favourable directions, and new technologies can be beneficial to poor people).

Policies, institutions and processes

According to the DFID Sustainable Livelihoods Guidance Sheets, "structures in the framework are the hardware – the organizations, both private



Source: NRI unpublished teaching material.

Figure 1: Sustainable livelihoods framework

and public – that set and implement policy and legislation, deliver services, purchase, trade and perform all manner of other functions that affect livelihoods. They draw their legitimacy from the basic governance framework". Broadly speaking, the organizations forming the structure belong to two main categories, that is, the public sector (e.g. political bodies, executive agencies, judicial bodies, quasi-government agencies), and the private sector (e.g. commercial enterprises, civil society, NGOs).

One of the key principles of the SLA is the attempt to link micro- and macro-levels: the household/community level with processes initiated by government, the private sector and NGOs. There is a two-way influence between assets and policies and institutions. The presence or absence of relevant policies can have important effects on the livelihoods of the poor. Changes or transformations in these policies and institutions can be used to mitigate negative effects of trends on the overall asset status and cushion the impact of shocks and seasonality, thereby reducing people's vulnerability.

Livelihood strategies

Livelihood strategies are how people combine and use their assets to make a living, given the factors that make them vulnerable and the policy and institutional context within which they live. In the past, development efforts often sought to improve services and opportunities available to people (e.g. fisherfolk). However, the SLA seeks to understand the factors behind people's choice of livelihood strategies and to reinforce the positive aspects and mitigate the constraints or negative influences. In sum, the SLA seeks to identify measures that build on the strengths the people have while at the same time trying to reduce the level of vulnerability.

Livelihood outcomes

Livelihood outcomes are the achievements or outputs of livelihood strategies. People often aim for a range of preferred outcomes based on their perceived priorities and objectives, for example, income, well-being, food security, sustainable use of natural resources, reduced vulnerability or increased decision-making power. Livelihood outcomes are not necessarily coherent and there can be conflicts between different outcomes. For example, an increased income may be achieved at the expense of the natural resource base (e.g. declining fish stocks), or different household members may have different priorities.

"When analysing the livelihoods outcomes, it is important to understand not only the aims of particular groups but also the extent to which these are already being achieved" (DFID Sustainable Livelihoods Guidance Sheets). For example, if certain social groups are systematically failing to meet their objectives this may be because of lack of assets or that their aims are in conflict with those of other, more powerful, groups.

Methodology

In order to get an holistic, but at the same time, in-depth understanding of people's livelihoods, it is important to employ different perspectives, such as those offered by socio-economics and natural sciences, with their own complementary methods and tools. There is not a single approach, but rather a wide collection of many tools, each having their own strengths and applications, from which one can choose and then adapt according to needs. Generally speaking, it is best to start with a broad perspective to gain a general understanding of the whole fish distribution system and then focus on relevant factors identified during the initial scoping study.

A wide range of tools can and should be used for data collection to support an analysis based on the SLA for complementarity and obtaining a broad and in-depth understanding. It is suggested that a combination of participatory, qualitative and quantitative tools could be used. Suggestions include:

- participatory methods, including tools such as Venn diagrams, seasonal calendars, social and resource mapping, matrix ranking, wealth ranking exercises

- sample surveys, including structured and semi-structured questionnaires
- institutional appraisal, including formal and informal access to credit
- identification and analysis of fish distribution channels
- market analysis and risk assessment
- social analysis
- gender analysis
- stakeholder analysis and conflict assessment
- participatory poverty assessment techniques
- case studies.

More details of a selection of these techniques are presented below in the section on data collection and analysis and in Appendix 5.

Chapter 2 Sub-sector Analysis

Background

Sub-sector analysis is a systematic approach to studying commodity chains with the aim of analysing all the participants, their linkages and influential factors in the commodity system in order to identify constraints and opportunities for growth. Although the approach may be primarily considered a tool for economic analysis, there are areas where social, technical, institutional and policy aspects of the commodity chain and its players are also assessed.

The formulation of programme and policy interventions tends to be the principal purpose for carrying out sub-sector analyses (e.g. NGOs such as CARE). In addition, the approach has also been used for the preparation of policy interventions by governments and donors (e.g. USAID). Originally, especially in the 1990s, the sub-sector approach was developed with a focus on agricultural commodity chains and agri-business. Although it can equally be applied to the fisheries sector, there are fewer examples where sub-sector analysis has been systematically used in this context. Here an attempt is made to fill this gap and place the approach in combination with a sustainable livelihoods approach in a fisheries context.

Holtzman (World Bank website, 2003), advocating rapid assessment methods, highlights the approach's emphasis on the economic performance of a commodity system and the participants involved. This includes investigation of the structure, conduct and performance of a sub-sector.

Analysis of the *structure* of the commodity system usually focuses on the characteristics related to the number and size of firms in relation to the size of the market, the presence or absence of barriers faced by new market entrants, and product differentiation (Scarborough and Kydd, 1992). *Conduct*, in turn, relates to firms' behaviour in the commodity system in relation to strategies such as pricing and selling, overt or tacit inter-firm co-operation (or rivalry), and research and development activities. The characteristics commonly investigated for *performance* are the results of structure and conduct, such as a sector's productive and allocative efficiency, progressiveness, equity and employment. One of the criticisms faced by this school of thought relates to the generally made inference relating the number of firms to their conduct and performance. For example, it is often implied that a larger number of firms means a more competitive sector; on the other hand, it has been demonstrated that the existence of fewer firms in a sector (e.g. oligopolistic market) may also lead to the type of inter-firm rivalry akin to the perfectly competitive model.

Another set of indicators used to analyse the efficiency of a marketing system are derived from price, cost and margin data. Marketing margins are commonly referred to as the difference between two prices in the chain (e.g. between consumer and producer prices, or between other points in the marketing chain such as wholesale and retail market prices). Deconstruction of margins into cost elements and enterprise return can be employed to provide insight into the efficiency of resource allocation in production, distribution and consumption (Scarborough and Kydd, 1992).

Concepts and Definitions

According to Miles (2003) and Holtzman (2003)[2], the following key concepts must be considered when performing a sub-sector assessment.

Sub-sector

A sub-sector is defined as a group of enterprises involved in the production and marketing of one well-defined product or several closely related products.[3] A commodity sub-sector does not necessarily lie strictly within one particular sector; it can cut across a number of industrial sectors (e.g. fish catching, transport and manufacturing). The key to this definition is the particular network under review. This might be based around a common raw material, such as fish, or a common output, such as fishery products.

Horizontal and vertical perspectives

The horizontal perspective refers to a particular stage of the production or distribution system where a similar set of functions is performed (e.g. fish retailers, vendors and hawkers). As for the vertical perspective, fish are caught in the sea, rivers and publicly or privately owned inland waters (e.g. ponds), and work their way vertically through the marketing system to the consumer. This may include processing such as freezing, canning, drying or salting. The combination of vertical and horizontal perspectives shows the sub-sector participants, illustrating where and how they function in the marketing system.

Markets

An assessment of the markets is essential when performing a sub-sector assessment. This includes an analysis of supply and demand, the number and importance of buyers and sellers, prices, quality standards, etc. Although it may not always be straightforward to obtain precise figures on this, an understanding of the approximate size of the market (i.e. in terms of quantity and/or value) provides an indication of the importance of the sub-sector. In particular, if new interventions are planned, there must be a viable long-term market for the sub-sector commodity.

Competition

In the fish marketing chain, competition exists across every level in that, for example, wholesale traders compete with other wholesalers, and exporters with other similar players. Competition comes from domestic sources, as well as from other countries. Understanding the competition, domestic and international, can shed considerable light on the problems faced by all in the sub-sector, as well as illustrate the techniques used by successful enterprises.

International dimension

In the era of globalization, commodity chains or food systems have to be considered from an international perspective. In particular, export industries are highly interlinked with international markets. In addition to the dynamics of these markets (e.g. supply, demand, prices, quality requirements), it is important to understand the wider context in which they function (e.g. international seafood trade, food safety legislation, international conventions and agricultural policies).

Technical issues

In addition to economic, social and institutional issues, it is important to understand the technical aspects of the sub-sector, for example, processing, transportation, packaging, means of preservation such as chemicals or ice, preservation, and different categories of loss (i.e. quantitative and qualitative).

Co-ordinating agents, institutions and mechanisms

Co-ordination of food systems is an active process performed at different levels by participants of the

[2] Both sources are available on the World Bank website as part of their Guide to Developing Agricultural Markets and Agro-enterprises.
[3] Wilcock, D. (1991) The sub-sector approach to agribusiness projects. *Developing Alternatives* 1 (2). (DAI, Bethesda, MD, USA.)

system or by external stakeholders (e.g. government policies and regulations). Firms at particular key stages of a commodity sub-sector are co-ordinating agents, for example:

- wholesale traders or processors are located at key stages and handle or process large volumes of a commodity, co-ordinating assembly, transformation and distribution
- government agencies provide needed services, commodity or agribusiness trade associations
- formal groupings of producers, traders and processors act as co-ordinating institutions; various types of formal and informal contractual arrangements, alternative forms of markets (spot, futures, auction), electronic information exchanges, and vertical integration are co-ordinating mechanisms.

Uncertainty in the fisheries sector, the perishable nature of fisheries commodities (limited storage and shelf-lives), and increasingly stringent quality and phyto-sanitary requirements are incentives for sub-sector participants to devise effective co-ordinating institutions and arrangements.

Leverage

Leverage is the ability to affect large numbers of sub-sector participants with the least action. Sub-sector assessment aims to find cost-effective opportunities where this can be accomplished – these are known as points of leverage. The point of leverage can be access to credit, a law that is preventing access to, or expansion of, a sub-sector, or a new technology that would dramatically improve production capabilities.

Stakeholder commitment

If a project is to be implemented based on the analysis, it is critical to ensure the early commitment of local organizations that have a stake in the sub-sector. These organizations can vary from fisherfolk co-operatives and NGOs to trade associations, but they must play a substantial role in the sub-sector and be involved in the implementation once the assessment is completed.

Sub-sector Mapping

The sub-sector map is an essential tool for the analysis of a commodity system. The map illustrates the flow of commodities or products from producer to consumer in quantitative, graphic terms, as well as the interrelationships between participants in the sub-sector. Several components should be illustrated in the map.

- **Markets** Markets are the final destination of the product (i.e. fish and seafood products in our case). These can be defined either by location, such as domestic or international, or by the type of end-user (e.g. human consumption, industrial users).
- **Functions** Each step through which the product passes during the production and distribution system is referred to as a function. For example, in the case of the dried fish marketing chain of the Bangladesh study, the fish is caught, processed, transported, stored and traded before it reaches the consumer.
- **Participants** Participants are the key actors and their roles within the sub-sector (e.g. fisherfolk, processors, wholesalers, exporters, retailers, consumers). Operators or players are other terms often used synonymously.
- **Commodity chain** Commodity chains tend to consist of different channels through which goods flow from the point of catch or production to the end-user. Marketing channels, on the other hand, are made up of participants, differentiated by technologies, functions, linkages and geographical locations.

Steps Involved in Sub-sector Analysis and Resources Required

Box 2 provides an overview of the principal steps involved in a sub-sector analysis. It is generally accepted, that sub-sector assessment is an iterative process through which the analysts hone their skills and develop their techniques for conducting assessments by actually doing them.

Often informal, semi-structured techniques are adequate for data collection in sub-sector analysis although in-depth studies and the validation of conclusions may require more than this (e.g. structured questionnaire surveys).

Resources required vary in length and scope. Generally, a 2–4-person inter-disciplinary team of socio-economists and engineers/technical experts are considered necessary for the study.

The time required to undertake the assessment may vary from about one month for a small sub-sector to 2–3 months for a larger or multi-channel sub-sector.

According to Miles (2003), "throughout the assessment the following questions must be considered:

- Who are the key players in the industry?
- What channels exist and which ones are growing faster?
- What is helping or impeding this growth?
- Where do opportunities exist for future growth and expansion?"

Appendix 3 provides details of the steps outlined in Box 2. The following sections outline how to combine SLA and sub-sector analysis and describe the major elements of data collection.

Box 2: Main steps of sub-sector analysis

Establish Initial Understanding

Step 1. Define sub-sector for study
Step 2. Familiarization with the sub-sector
Step 3. Draw preliminary sub-sector map
Step 4. Specify the environment affecting participants

Refine Your Understanding

Step 5. Refine the sub-sector map
Step 6. Quantify overlays of particular interest

Identify Leveraged Interventions

Step 7. Analyse dynamics
Step 8. Identify sources of leverage
Step 9. Explore opportunities for leveraged intervention

Haggblade *et al. A Field Manual for Sub-sector Practitioners*. in Miles, T. (2003).

Chapter 3

Combining Sub-Sector Analysis With The Sustainable Livelihoods Approach

Using a combination of the Sustainable Livelihoods Approach (SLA) and sub-sector analysis proved to be a useful analytical framework to gain new knowledge on the post-harvest fisheries sector in the Bangladesh and India research projects. Although commodity systems or sub-sectors are not usually seen as an entry point for a livelihoods analysis, a sub-sector approach seems justified if an entire, or at least a large proportion of the population group, depends on one particular commodity (e.g. fish and other seafood products in many parts of coastal Bangladesh and India). Also, the DFID Sustainable Livelihoods Guidance Sheets emphasize that "livelihoods and sector-wide approaches are broadly complementary; each should gain from recognizing the strengths of the other".

The approach permitted the investigation of the domestic (i.e. Bangladesh) and international (India) fish and seafood distribution systems, highlighting poverty implications at the same time. As already mentioned, the focus of the study in Bangladesh was on market and credit access issues, whereas the India study concentrated on globalization, international food safety legislation and the seafood export industry.

In the following sections, an introduction to the institutional side of a project is provided before embarking on the technical issues covered by the research.

Building a Project Partnership

In order for projects to yield longer-term impact, it is important that strong partnerships are built between the organizations involved in the research. Both the SLA and sub-sector approach require stakeholder commitment if the project is to make an impact beyond its actual lifetime.

In this context, a distinction needs to be made between those who are carrying out the actual research (core team) and other stakeholders. The latter may include primary stakeholders, such as fishing and trading communities, and secondary stakeholders, such as the funding agency or government departments.

A clear identification of roles and tasks as well as allocation of resources between the core members of the research team need to be agreed upon at an early stage in the project. Both core team members and other stakeholders have a role to play in designing the methodology and agreeing on the outputs to be produced within the boundaries provided by the funding agency. Often, the latter may have identified, through previous exercises, the key issues on which the research would be expected to concentrate.

Experience of this type of research shows that sharing of information amongst the team members, and inception and consultation workshops at the beginning and end of the projects, stimulate the exchange of information between the project core teams and other stakeholders.

The following sections provide an overview of the main technical areas where the SLA and sub-sector approach were combined in the two research projects.

Approaching the Topic

Desk research was undertaken prior to the start of the fieldwork to gain an understanding of the fisheries sectors and the key issues involved. In the India project, this involved a study on globalization, international seafood markets, food safety legislation and livelihoods-related aspects. In the Bangladesh project, the key points were linked to market and credit access in the domestic fish distribution system. These studies helped the respective research teams to build on existing work and focus the design of fieldwork and data collection. (Systematic review by the research teams of research and grey literature is essential to avoid 'reinventing the wheel' and making unnecessary blunders.)

Mapping the Commodity Chain

In the first step of data collection, the commodity chain was mapped to identify the different market participants and their functions. In addition to technical and economic aspects as advocated in sub-sector analysis, mapping also allows the identification of the poor within the commodity system (e.g. small-scale fisherfolk and processors), as compared to large-scale operators, such as wholesale traders and exporters.

Although, it is preferable to obtain data on the number of players involved as well as quantities of produce and related values, this may prove difficult in the absence of reliable statistics. In particular, estimating the numbers of small-scale operators in countries with large populations, such as India and Bangladesh, is likely to require several exercises, which may include techniques other than commodity chain mapping (e.g. wealth ranking and participatory poverty assessments at the micro-level).

If poverty alleviation is the ultimate objective of the research (i.e. through policy advice or a project intervention), the location of the poor and their functions on the map should be emphasized. As part of a participatory exercise, it is suggested that participants in the marketing chain undertake the mapping themselves as much as possible. At the same time, it needs to be borne in mind that the resulting maps may be quite location-specific reflecting the knowledge of the market participant who drew the map. In general, larger-scale operators, such as wholesalers, can provide the best overview of the chain. Also, knowledgeable key informants, such as government officials or NGO workers, can add extra information to the map.

It is recommended that each group of stakeholders be asked to draw a map of the commodity chain from their perspective. The research team should then combine all the different maps into one overall commodity chain map. This 'final' map could be used for discussions with a group of stakeholders for their feedback and further clarification if necessary. Appendix 4 provides a map produced as part of the Bangladesh project. The practical issues of mapping and related constraints will be dealt with in the section below on data collection and analysis.

Understanding the Livelihoods Context of Sub-sector Participants

Once the sub-sector and its participants were mapped out, the participants' livelihoods was studied using the SLA as the methodological framework. As outlined in Table 1 this requires the collection and analysis of data on the key SLA issues discussed earlier (see page 6).

It needs to be borne in mind that each category of operator is likely to have several sub-categories (e.g. in the case of traders: wholesalers, intermediary traders and retailers; in the case of processors: owners of the enterprise and workers).

Table 1: Framework for the analysis of livelihoods of sub-sector participants

	Fishing sector	Traders	Processors	Exporters
Capital assets Human Social Natural Financial Physical				
Vulnerability context Shocks Trends Seasonality				
Policies, institutions, processes				
Livelihoods strategies and outcomes				

Importance of keeping the analysis poverty-focused

A common complaint of the SLA is that given its holistic perspective it is difficult to know when and where to stop the livelihoods analysis. For example, it may be the case that a commodity chain has several categories of players at the same stage in the chain (e.g. traditional fishermen, semi-traditional trawler operators, large-scale industrial trawlers). Although one might be tempted to study fully the livelihoods context for each participant, owing to constraints, such as time or other resources, it may be necessary to focus on a few selected players only. Typically, in poverty-related studies or interventions, these should be either operators belonging to the poor or those whose actions have a significant bearing on the latter's livelihoods (e.g. main trader categories). Equally, it may be sufficient to limit the analysis to key issues for those who clearly do not belong to the category of the poor. For example, it may be sensible to focus on exporters' ability to access financial resources or influence policies and institutions rather than concentrate on their human or social capital assets. In essence, it is important to remain focused in carrying out the livelihoods part of the study.

Gender perspective

When studying the livelihoods context of participants in the commodity system, it is recommended that the analysis be undertaken from a gender perspective, distinguishing between female and male participants. For example, depending on culture and other circumstances, it is sometimes the case that female participants in the sub-sector face more difficulties in accessing certain types of livelihoods assets or institutions compared to their male colleagues. At the same time, specific tasks performed in the commodity chain may be primarily undertaken by female operators.

Dynamics of the sub-sector

By looking more closely at the changes that have taken place, it is possible to develop an understanding of how the stakeholders have been affected by these changes and how they have adapted to, or coped with them. For example, in the India study, it was important to trace the changes resulting from new legislation by

importing countries and its impact on poor participants in the export chain such as shrimp peelers.

Access to capital assets

For details of the different livelihoods capital assets see the section outlining the Sustainable Livelihoods Approach (page 6) (see also Appendix 2). The following provides some of the key elements to be considered in the context of fishing communities, for example, human capital not only includes levels of education and health but also fishing skills and knowledge of the environment such as weather and sea conditions. Social capital involves access to support networks (e.g. relatives or friends) in times of hardship, or membership of associations. Natural capital primarily includes aquatic resources such as fish stocks and other resources in the wider community context. In the context of fish catching and marketing, physical assets include the actual fishing gear (e.g. boats and nets), but also the public infrastructure such as landing sites, market facilities and transport infrastructure. Financial assets include cash, savings and access to formal and informal sources of credit. This may include transactions whereby loan supply and marketing arrangements are interlocked (i.e. obtaining credit has a corresponding, possibly pernicious, liability). As already indicated earlier, it is important to bear in mind that some capital assets can be negative (i.e. liabilities). For example, some experts suggest that access to credit is best regarded as neither an asset nor a liability. This is because a loan taken by poor fisherfolk leads to a financial capital liability which is offset by another capital asset (e.g. physical asset such as gear, or human capital asset acquired through education).

Vulnerability context

Following the analysis of people's assets, it is important to understand the vulnerability context in which these assets can be used. These external factors are often related to the causes of poverty which make poor people, in particular, vulnerable. Shocks, trends and seasonality are the three main concepts that are usually analysed in this context and are described in the section outlining the Sustainable Livelihoods Approach (page 6) (see also Appendix 2). In our analysis, introduction of new seafood trade legislation would be described as a shock. Typical trends influencing the livelihoods of fishing and trading communities include declining fish stocks and increasing demand due to, amongst other things, population growth. The two factors combined result in an upward pressure on fish prices to the disadvantage of poor consumers. Seasonality includes recurrent changes throughout the year that influence people's assets and livelihood outcomes. For example, the major fishing season may occur during the rainy season, thereby limiting cash income to a few months per year. This, in turn, is likely to result in a strain on the household cash flow and household food security during the lean season.

Policies, institutions and processes

These have been mentioned above in the section outlining the Sustainable Livelihoods Approach (page 6) (see also Appendix 2). Within a sub-sector and SLA context, it is important to investigate to what extent key stakeholder groups in the commodity chain can influence policies and have access to institutions. The latter may include trader associations, but also local government departments and the judiciary. In particular, small-scale operators often suffer from lack of access to these institutions, which in turn makes them more vulnerable and contributes to their poverty.

Livelihood strategies and outcomes

In a fisheries context, the livelihood strategies adopted (see section outlining the Sustainable Livelihoods Approach (page 6) (see also Appendix 2) reflects the activities people undertake and the roles they play as part of the commodity sub-sector (e.g. fish catching, processing or trading).

At the same time, it is important to be aware of strategies open to sub-sector participants which are not necessarily fisheries-related (e.g. agricultural activities, migration, alternative income-generating activities). Income, well-being, food security as well as related wealth differences are some of the livelihoods outcomes resulting from livelihoods strategies employed by community members. Within this context, the added value of SLA to sub-sector analysis is that it looks beyond the fishery sector itself, recognizing that stakeholders may have other activities and priorities outside the fishery sector. Also, cross-sector linkages, which are important from the household point of view, can be traced within this framework.

Through participatory poverty assessments (PPAs), it is possible to gain an understanding of local perceptions and definitions of poverty, and what people themselves see as pathways out of, or into, poverty. Individual livelihood strategies might deal with different dimensions of poverty and aim for different outcomes. In the case of fisherfolk, access to consumption credit is an important mechanism to ensure food security and the ability to go fishing when the main season starts. In addition to exploring people's livelihood goals and preferred outcomes, it is also worthwhile obtaining an insight into the way people rank the outcomes of their livelihood strategies. Some fisherfolk, tied to local moneylenders through outstanding loans, might perceive it as exploitation and as a factor preventing them from moving out of poverty, as they cannot invest in alternative income-generating activities. Others might value the social security provided by the more powerful group within their community and accept the fact that they are limited in developing alternative livelihood strategies.

Further, social groups and/or individuals might value the trade-offs between immediate livelihood gains and longer-term losses differently, depending on the range of choices they have. Large-scale fishers might not be concerned by the decline in fish resources as they have sufficient resources to invest in other livelihood strategies if required. However, artisanal fishers might have a stronger incentive to work towards sustainable management of fishery resources, as they have limited alternative livelihood strategies due to lack of assets and their vulnerability.

Economic Analysis Focusing on Financial Capital Assets

Traditional sub-sector analysis is primarily used to develop recommendations for policy or project interventions focused on economic growth and performance, whilst one undertaken in combination with the SLA places stronger emphasis on poverty reduction amongst the members of the commodity system. Nevertheless, although the ultimate objective may be different, it is still considered necessary to undertake an analysis of selected key indicators to assess the performance of a commodity system. Also, it must not be forgotten that economic growth is one of the requirements for poverty alleviation.

As outlined above in the section on sub-sector analysis, one set of indicators measuring economic efficiency is related to the structure, conduct, performance (SCP) model. If the shortcomings of the model are taken properly into account (e.g. a smaller number of enterprises in the sub-sector does not automatically mean reduced levels of competition and vice versa), then the analysis can provide a useful insight into a sub-sector's functioning and its allocative efficiency.

The analysis of prices and marketing margins represents another set of indicators on which the performance of a commodity system can be assessed. For price analysis, it is important to decide what levels of analysis (i.e. levels of analytical depth) are ultimately required given the context of the study. The ready availability of price series as well as related deflators such as

consumer price indices (used to obtain real prices), are required to undertake more sophisticated analyses. On the other hand, if the research objectives have a strong focus on poverty reduction, then it may not be necessary to spend a lot of resources and time on price analysis.

As for marketing margins, it is recommended that these are deconstructed as far as possible into gross margins, cost elements and net margins. This allows a better judgement of whether certain sub-sector stages or their respective participants are responsible for excessive margins and returns. At the same time, care must be taken in comparing the results of these analyses across countries or regions, as they are often location-specific. An example is provided in Appendix 4 of how the analysis of marketing margins was conducted as part of the Bangladesh study.

Access to financial capital such as cash, savings and credit is another area that is likely to be important in the economic context of the sub-sector analysis. For example, one of the objectives of the Bangladesh study was to investigate the link between the supply of loans and marketing arrangements in the commodity chain. Although these types of inter-locked transactions can have beneficial impacts on the functioning of the sub-sector, there may also be negative effects in that direct and indirect capital costs can be excessively high leading to the exploitation of weaker participants in the chain.

Levels of income provide an insight into the levels of relative wealth and poverty within a fishing and trading community. Although there may be individuals who are comparatively rich in financial terms and otherwise, there are generally vast numbers of market participants who operate at the poverty line or below. A sense of well-being is highly subjective, and needs to be seen in the context of local wealth/poverty indicators. For example, in some fishing communities in India, boat and engine owners were in some cases not perceived as better-off as they were usually highly indebted and faced higher operation risks (i.e. high running and investment costs).

Technical Post-harvest Issues

The investigation of technical issues is an important element of sub-sector analysis, however, this should also be undertaken within a sustainable livelihoods context. This implies that aspects, such as access to ice for preservation of fish or losses (i.e. qualitative or quantitative) incurred in the commodity chain, ought to be assessed from a poverty angle (i.e. what are the implications for the poor sub-sector participants). Equally, technical measures affecting the product also ought to be seen from the viewpoint of the end-user. For example, inappropriate use of chemicals used for fish preservation may affect the health of poor consumer groups.

The Way Forward

Normally, the objectives designed at the beginning of the research will indicate the way forward once the research proper is completed. In general, there are two broad avenues in which the research findings may be used: (i) policy recommendations; and (ii) project/programme interventions.

Within a livelihoods framework, these future steps will be developed from a poverty perspective. However, if the dissemination of policy recommendations is to be effective, then it is important to establish appropriate links when the project is implemented. This may include regular consultation with government and donor decision-makers as part of workshops as well as study visits. Findings obtained through micro-level analysis need to be used for the preparation of policies targeting the macro-level.

NGOs can also play a role in the dissemination of recommendations if they are well-placed and have access to fora where policy measures are discussed. At the same time, NGOs may also be potential

users of research findings if they are carrying out project interventions targeting the poor.

The identification of points of leverage is advocated as part of sub-sector analysis, and the emphasis ought to be on measures which would allow the most effective impact on poverty reduction rather than economic performance as such (e.g. generation of foreign exchange). This applies to both policy recommendations and project interventions.

Steps Involved in the Case Study Projects

Tables 2 and 3 highlight the principal steps and methods involved in the research projects in Bangladesh and India which were mainly used for case study material in this guide. The outline of activities, responsibilities and time-frame is intended to assist the design of research in other potential projects.

Table 2: Project: 'Fish Distribution from Coastal Communities in Bangladesh – Market and Credit Access Issues'

Activities	Project partners responsible	Time-frame
Small, pre-project, stakeholder workshop in Chittagong to discuss components of project with potential partners	Organization: CODEC Facilitation: PHFRP Manager	January 2001
Review of existing literature on market and credit issues in the marine fish distribution system	CODEC	February 2001
Inception workshop attended by 30 stakeholders belonging to the private sector (fishing community and trader representatives), public sector, NGOs, donors, research institutions including the University of Chittagong	Organization and facilitation: CODEC and NRI	March 2001
Training of University of Chittagong research team in quantitative field survey methods to be used in coastal communities	Organization: CODEC Facilitation: consultants/ statisticians	July 2003
First round of market assessments and participatory rural appraisals (PRAs) in six coastal communities, plus preliminary analysis to identify gaps for follow-up	CODEC and NRI	July–September 2001
Questionnaire data collection by the University of Chittagong with funding from DFID SUFER project	University of Chittagong Marketing and Sociology Departments	November–December 2001
Entry, processing and analysis of questionnaire data	University of Chittagong Marketing and Sociology Departments	January–June 2002
Second round of PRA in coastal communities (two rounds of data collection were considered necessary due to high fishing season and off-season)	CODEC and NRI	January and April 2002
Consultation workshops in Chittagong and Dhaka involving stakeholders from the private sector, public sector, NGOs and donors	NRI, CODEC and the University of Chittagong	July 2002
Finalization of analysis and reports	NRI, CODEC and the University of Chittagong	August 2002–January 2003

Table 3: Project: 'Globalization and Seafood Trade Legislation – The Effect on Poverty in India'

Activities	Project partners responsible	Time-frame
Start-of-project workshop in Visakhapatnam to prioritize research agenda, identify tools and techniques to meet objectives	NRI, ICM, CMS and SIFFS	June 2001
Desk research on international seafood legislation	NRI	March 2002
Data analysis and assessment of the main export markets for Indian seafood products, particularly the EU, Japan and USA	NRI	June 2002
Data collection and analysis of the seafood export supply chains in Andhra Pradesh, Kerala and Orissa	ICM, CMS, SIFFS and NRI	June 2002
Analyse the changes in the livelihoods of poor participants in the export supply chain	ICM, CMS, SIFFS and NRI	December 2002
End-of-project workshop to present research findings, validate methodology and develop policy recommendations	NRI, ICM, CMS and SIFFS	January 2003
Dissemination activities – papers, reports, web articles (Final Technical Report)	NRI	May 2003
Further dissemination activities	NRI and PHFRP	2003–04

Review of methods used in the Bangladesh project

The research process started with a desk review assessing existing information. The identification of key issues and definition of areas of investigation was undertaken at the inception workshop. The main points thus identified fed into the design of the field surveys, which involved participatory, qualitative and quantitative survey techniques. In particular, the following techniques were used:

- participatory rural appraisal (PRA) using techniques such as semi-structured interviewing, wealth ranking, mapping, and transect walks
- rapid market appraisal (RMA) using techniques such as semi-structured interviewing and participatory mapping of commodity chains
- questionnaire surveys were conducted by the University of Chittagong and the results presented in separate reports: this involved a training course run by specialists in quantitative surveys (i.e. statisticians) organized at the CODEC training centre for the University of Chittagong team in July 2001.

During the first round of participatory/qualitative research (PRA/RMA), a good understanding of the 'reality on the ground' was developed. This was followed by the questionnaire survey, the objective of which was to obtain statistically valid estimates representative of the target population. A second round of PRA/RMA exercises was undertaken to cover the off-season, as far as marine fishing was concerned, and to fill any remaining information gaps.

The information thus generated was used for the development of policy suggestions, which were presented at final consultation workshops in Chittagong and Dhaka together with the findings of the research.

Types of information covered

For each operator category (i.e. fish suppliers and traders) in the Bangladeshi marine fish distribution chain, the following types of information were elicited as much as possible:

- socio-demographic information: wealth, gender and age
- household asset base: human capital, social capital, natural resources, physical capital and financial capital
- vulnerability context: shocks, trends, changes, seasonality, pollution, etc.
- marketing system: supply and demand situation, pricing mechanisms, prices, marketing costs and margins, technical post-harvest issues, food safety issues, availability of market information and means of communication used, infrastructure, changing consumption patterns, performance of marketing system versus equity considerations
- savings and credit system: types of savings and credit, access to formal and informal sources of credit, relative costs of credit, links between fish distribution and credit supply, patronage relationship, occurrence of exploitative practices, lessons from the broader micro-finance sector
- policy, institutional and process issues (also beyond the fish production and trading context): national and local government, donors, NGOs, the private sector.

Review of methods used in the India project

The methods employed during the field studies were standardized as much as possible so that results from the three states (i.e. Andhra Pradesh, Kerala, and Orissa) could be compared.

The basic research question to be answered was 'How has international seafood legislation (such as the EU directive) affected the livelihoods of poor people who depend on the export industry?'

To answer this question, we needed to know who was involved in the export industry (i.e. all the categories of people involved from the time the shrimp is caught to the time it is loaded on to the ship).

This involved a two stage study: (i) mapping the export supply chain; (ii) identifying the poor within the supply chain and studying the impact that international legislation has had on them.

Stage 1 – Mapping the supply chain

Information on the supply chain was collected from secondary sources such as:

- key informants from government authorities, central agencies
- published documents of various previous projects and workshops/meetings
- magazine and periodical articles
- the world-wide web
- previous studies of export chains in the three states.

Stakeholders identified include:

- crew and owners of trawling vessels
- crew and owners of artisanal fishing units
- owners and workers of aquaculture farms
- middlemen traders who deal exclusively in export species
- peeling shed owners and workers
- processing plant owners and workers
- exporters
- ancillary industries such as ice plants, transportation, headload workers, etc.

Stage 2 – Understanding the impact of the legislation

The following questions were asked to the various stakeholders:

(i) Who are the poor in the supply chain?

(ii) What has been impact of international legislation on these?

(iii) What have been the changes in their livelihood strategies?

(iv) What has been the impact of international legislation on the stakeholders, particularly the poor participants of the Indian seafood industry?

The main tool employed for the fieldwork was participatory poverty assessment (PPA) in focus group discussions and individual interviews with the different stakeholders.

Data Collection Methods

Desk studies

Desk studies are particularly important if there is little knowledge of the research topic prior to project design and data collection. Desk-based literature reviews were carried out by both projects prior to the start of fieldwork. The Bangladesh project primarily focused on the domestic fish marketing chain emphasizing market and credit access issues. The literature review mostly relied on printed material. On the other hand, given its nature and context (i.e. globalization, seafood safety legislation and livelihoods), more use was made of web-based material in the India project (see Appendix 1 for a list of websites on fisheries-related topics). The topics covered in this desk research included:

- globalization issues, focusing on potentially positive and negative impacts
- the Indian fishing industry
- major export markets for Indian seafood products, and the dynamics and patterns involved (i.e. mainly USA, EU, Japan and China)
- international seafood safety legislation focusing on both the institutional and technical context.

The lack of reliable fish export statistics and the fact that import figures for one country did not always match supposedly corresponding export figures for

Box 3: The use of participatory poverty assessments

Participatory poverty assessment (PPA) was undertaken to gain an understanding of who constitute the poor within the fishing communities in India. PPAs were conducted using a common framework in the three states. Efforts were made to encourage participants from the communities to produce their own definitions of social and economic categories (relative wealth) that are relevant to their village and to place the various stakeholders, such as artisanal fishermen, trawler crew and peelers, in these categories based on their observations. These assessments were made at community level to understand the poverty within the village situation and at stakeholder level so as to characterize poverty as it is relevant to the export sector and thus to try to identify the 'export poor'.

One of the problems identified during the discussions was how poverty was defined. The methodology gave a subjective assessment of poverty based on ideas created by participants in the discussions rather than an absolute measure of wealth. It was felt that more in-depth studies could be undertaken in this regard. Poor in some areas may mean not poor or not-so-poor in others. Details of how different people (including the poor) are paid or compensated for their work/efforts could have been included.

another country was a problem encountered by the research team. The use of best judgement was often the only solution in these circumstances.

Participatory survey methods

Historically, information-gathering exercises have tended to be protracted, expensive, narrow in their focus and heavily weighted by preconceived ideas. As a result, in the early 1980s, the rapid rural appraisal (RRA) approach to initial project preparation was developed. By the end of the decade, there was a range of RRA methods and approaches available which then gave rise to participatory rural appraisal (PRA) at the beginning of the 1990s. In addition to these two, probably the best known informal appraisal methods, there are now newer methods such as PLA (participatory learning and action) and PPA (participatory poverty assessment).

Although RRA and PRA have many features in common, the latter added a few elements which were not always prominent in RRA: for example, more emphasis on participation, change of attitudes towards rural populations, trust between project partners, sharing of information and ultimately, the empowerment of local communities.

The main principles of informal data gathering include triangulation, flexibility and multi-disciplinary teamwork.

- Triangulation is intentionally collecting information from several different perspectives which can be achieved through the team composition (e.g. level of experience, gender and discipline), selection of units of analysis (e.g. farmers groups, households or individuals) or techniques (e.g. scoring, mapping and diagramming).
- Flexibility is the absence of a rigid protocol and the possibility of changing techniques and tools when necessary. At the same time, it ought to be remembered that rapid and participatory data collection exercises have to be well-planned.
- Multi-disciplinary teamwork implies a team of individuals with different professional backgrounds responsible for collecting and analysing data from rural environments.

Important points to remember when undertaking an informal survey (or indeed any survey) include the following.

- Decide on the *objectives* before beginning. Without clear objectives, there is a danger that the exercise will be unfocused and lead to feeble conclusions.
- Decide on the *team composition* (right mix of experience, gender and discipline), team training required, team size (not more than two or three), and number of survey teams carrying out parallel surveys (not more than three). In addition, aspects such as team dynamics, team introduction to villages, note taking and report writing, and the need for a common base for the survey teams need to be properly addressed.
- Define the *role of the survey team,* i.e. the fact that survey methods such as PRA and PPA are widely recognized as a means of involving the local population in the analysis of their own livelihoods systems cannot be stressed enough.
- Consider *stratification* of the survey area or population if not all locations, individuals or groups in the demonstration areas are to be included in the survey. The survey area or population should be divided into sub-sets within which the variability of key factors is expected to be lower. A sample of individuals, groups or locations for actual survey can then be selected from each sub-set. A typical example is that of ecological zones or technologies used (e.g. fishing systems).
- Decide in advance whether to have *groups or individuals of coastal communities* as the unit of investigation. This will depend on the circumstances and the subject of analysis. Group discussions are particularly useful if the information required is not expected to vary widely between households. Also, if the issue under discussion is not too sensitive in nature,

a group interview may provide an easy overview of likely variables, such as fishing technologies used.

- Cross-check findings by *direct observation* of important indicators to avoid being misled by rumour, myth or gossip.

The main tools and techniques used in participatory data collection include:

- semi-structured interviews
- different forms of ranking and scoring (e.g. wealth ranking, pair-wise ranking, matrix scoring)
- mapping (e.g. transect walks, resource maps, commodity chains)
- construction of diagrams (e.g. seasonal calendars, historical profiles, daily routine charts, Venn diagrams, decision trees)
- participatory poverty assessments (often using a combination of the above techniques).

A detailed description of all the tools and techniques used in participatory appraisals is beyond the scope of this guide. If more information is required it is advisable to consult the literature (see also Appendix 1) or participate in a training course. A selection of tools used in the Bangladesh and India studies (e.g. checklists for semi-structured interviewing, mapping and participatory poverty assessments) is provided in Appendix 5.

Rapid market appraisal

The origins of rapid market appraisal (RMA) are similar to those of rapid rural appraisal (RRA), in that formal surveys were often seen as lengthy, costly and management intensive. As a consequence, a set of tools was developed by Holtzman (2003), who also used the sub-sector approach as the framework for analysis.

Unlike questionnaire surveys, which usually depend on enumerators, RMAs are conducted by analysts who should preferably have several years of experience of the topic.

According to Holtzman (2003), "used by experienced analysts, having a cross-country comparative perspective, rapid appraisal is a way to:

- gain a food systems view of how a commodity sub-sector is organized, operates and performs
- identify sub-sector constraints and opportunities
- identify and diagnose policy and regulatory problems that require government (and donor), analysis, attention and action
- prescribe interventions in food system organization, technology and management.

Rapid appraisal methods can also be useful exercises at the beginning of longer-term programmes of applied research and testing of marketing systems innovations. In addition, they can be used to do focused study up-dates (of earlier formal surveys), and as a complement to a longitudinal, formal research programme. Finally, rapid appraisal surveys can be used to identify agri-business opportunities, as well as to design, monitor and evaluate donor-funded projects and policy reform programs".

Rapid market appraisal techniques mostly rely on semi-structured interviews with key informants, knowledgeable observers of a sub-sector and a minimum number of participants at different stages of the commodity system. Interviewing at least 3–5 participants at each stage is considered necessary to obtain a reasonably reliable picture of a certain category of operator. The decision on the minimum number of interviewees depends on the divergence of answers and opinions obtained from them. The coverage of more controversial issues requires a relatively larger number of interviews.

Mapping commodity chains forms part of the set of 'informal', semi-structured techniques used to identify participants of the sub-sector, its functioning, quantities and values involved, technologies used, constraints and opportunities. The drawing of commodity maps by sub-sector participants or knowledgeable key informants is

accompanied by interviews aiming to obtain information on these key issues.

Selective visits to physical facilities such as landing sites, processing sheds and markets are necessary to cross-check the information obtained through interviews. Direct observation of operations and facilities helps to improve the understanding and to cross-check the data already obtained. Another form of cross-checking (or triangulation) is based on posing the same set of questions to other operators at the same stage of the sub-sector or at adjacent stages in a technique known as mirror-image interviewing (Holtzman, 2003).

One of the practical aspects of rapid appraisals undertaken with market participants include the latter's time constraints – they often tend to have little time, particularly when visited during their working hours. As a result, checklists and interview guidelines need to be more focused as compared to semi-structured interviews or group discussions carried out with villagers (e.g. fisherfolk or farmers). Sometimes, it is more appropriate to agree an alternative date for a discussion with an individual or a group of operators deemed important as information sources.

Quantitative methods/ questionnaire surveys

Questionnaire surveys should be seen as a tool to complement RMAs and PRAs. In particular, formal sample surveys are required if the objective of the study is to derive statistically valid, quantitative estimates that are representative of the target population. According to the DFID Sustainable Livelihoods Guidance Sheets, livelihoods analysis makes use of both qualitative and quantitative research, whereby the latter seeks to place reasonably firm, absolute levels or values on the things that are being investigated.

The scope of this guide is not to provide an introduction into statistics but to highlight a number of key questions[4] deemed important for the implementation of quantitative surveys.

The *planning stage*, beginning with the setting of exact objectives, is one of the most important parts of all surveys. In the case of statistical surveys, this includes deciding on the type of data to be collected, target population, sampling techniques, statistical measures and analytical tools to be used, and presentation of results.

The *types of data* that have to be considered include continuous data (e.g. weight data), counts (e.g. number of individuals in a household), scores (e.g. qualitative loss data might use numbers of 0 to 5, with zero being no loss and 5 being severely damaged), and binary/categorical data (e.g. classification of fishing technologies into categories such as main gear used; if only two categories exist then one would talk of binary data).

Sampling is used where it is unnecessary, impossible or too expensive to measure everything. Therefore, a small fraction of the material is measured. When designing a sampling scheme, it is important to define a 'target population' for which information is required. A sample from this population is then selected to estimate values for the population (e.g. percentage of fishermen using a particular fishing method).

There are two statistical concepts which are important for sample estimates: bias and precision.

A *biased estimate* is one which tends to always overestimate the 'true' population value (or tend to underestimate it). For example, if extension officers are asked to nominate farmers to participate in a survey, they might tend to select the more progressive farmers, or ones who can better afford to take risks. This would distort the

[4] Adapted from Sherington, J. (1997) Statistical Concepts in Research (prepared for NRI's Grain Storage Management Course). Chatham, UK: Natural Resources Institute. (unpublished)

results. Ideally, samples should allow for unbiased estimates of the characteristics of interest.

Precision relates to the consistency of estimates if the sampling was carried out a number of times. In general, the larger the sample, the more precise the estimate. For example, a sample of 1000 plots will give a more precise estimate of yield than a sample of 10 plots. Precision also depends on the amount of random variation between units. For a given sample size, measurements with large standard deviations will give less precise estimates than those with small standard deviations.

While both unbiasedness and precision are both important, unbiasedness is generally a higher priority. There is little use in getting precisely the wrong answer!

The best way to ensure lack of bias is by *random selection* of units in the population. The overriding principle for selection of a simple random sample is that every unit should have (approximately) the same chance of being selected. Where this proves impossible, then the target population (and related objectives) may have to be redefined (e.g. farms less than 1 km from a road or grain store accessible with a certain type of probe).

There are a number of common statistical measures to be calculated such as mean, median, standard deviation and minimum - maximum. In addition, trends and relationships can be studied, and statistical tests carried out. Standard errors are calculated to put a precision on estimates. Once again, it is not intended to provide here a complete handbook on statistical data collection in rural areas but to give some guidelines for those involved in a research project.

For collecting baseline information in demonstration areas, it is best to concentrate on the avoidance of bias when selecting the sample population and to use the most common measures for calculation.

In most situations, it will be necessary to design *data recording forms* (e.g. questionnaires) for each project or demonstration area and technology. As indicated earlier, survey and data recording forms should be kept to a minimum. Avoid collecting unnecessary data or information which can be better obtained using participatory methods.

When using data recording forms, it is suggested that manual copying be limited as much as possible owing to the possible introduction of error and loss of time efficiency.

Nowadays, the use of computers and statistical programmes is fairly standard for the analysis of quantitative data. Aside from common database and statistical computer programmes such as Access, SPSS and SAS, spreadsheet programmes can also be useful, particularly if databases are relatively small and the statistical calculations to be carried out are not complex.

Although often overlooked, *presentation* of results is an important part of every statistical analysis. Well presented results can greatly facilitate the *interpretation* of statistical data and the drawing of conclusions.

Numerical results are usually presented in the form of tables or graphs, depending on whether numerical precision or an indication of trends is required. Nevertheless, in the evaluation of technologies, some statistical data may feed directly into financial calculations.

In the case of the questionnaire surveys undertaken by the University of Chittagong, SPSS (version 10.0) was used for data analysis. The statistical techniques for analysis and presentation include: frequencies, averages, dispersion, ANOVA and chi-square tests, tables and graphs. Financial management tools were also used (e.g. ratio analysis).

Combinations of quantitative and qualitative methods

If carried out in a focused manner, the qualitative and quantitative survey techniques can complement each other. Box 4 indicates examples of how the two survey techniques can draw on each other during the survey design, and data collection and analysis stages.

Box 4: Examples of qualitative and quantitative combinations of survey instruments

Type A: Merging tools and attitudes

- Thinking about sampling in designing enquiry based on qualitative methods.
- Coding responses to open-ended questions from qualitative enquiries.
- Using statistical techniques to analyse unbalanced data sets and binary, categorical and ranked data sets, arising from participatory enquiry.
- Creating frequency tables from coded data.
- Modelling binary and categorical data generated from ranking and scoring exercises.
- Using mapping to generate village sampling frames for: questionnaire surveys; type 2 or type 3 on-farm trials.
- Using attitudes from participatory methods (e.g. to reduce the non-sampling error in questionnaire surveys or farmer-researcher misunderstandings in on-farm trials).

Type B: Sequencing of tools

- Using participatory techniques in exploratory studies to set up hypotheses, which can then be tested through questionnaire-based sample surveys or via on-farm trials.
- Choosing a random sample and conducting a short questionnaire survey to gain information on key variables, which are then investigated in-depth by participatory enquiry.

Type C: Concurrent use of tools

- Survey of statistically selected sample members, using pre-coded questionnaires to determine target population characteristics of a qualitative (e.g. opinions on a new technology) or quantitative (e.g. crop production) nature.
- Setting up scientific experiments (on-station or type 1 trials) to study the effects of specific interventions in a controlled environment (e.g. on-station or 'contract' research).
- Using aerial photographs or GIS.

along with:

- Participatory enquiry for attitudes, beliefs and perceptions of the target population.
- Type 3 trials.

Note: Type 1 on-farm trials are those designed and managed by researchers. Type 2 trials are designed by researchers but managed by farmers. Type 3 trials are designed and managed by farmers and monitored by researchers (Coe and Franzel, 1997).

Source: Marsland *et al.* (2001).

References, Further Reading Material and Relevant Websites

Appendix 1

Alam, K. (1996) *Two Fishing Villages of Bangladesh: A Community Study.* PhD thesis, Department of Development and Planning, Faculty of Social Sciences, Aalborg University, Denmark.

Ashley, C. and Carney, D. (1999) *Sustainable Livelihoods: Lessons from Early Experience*. London: Department for International Development.

Ashok, M. S., Clucas, I. J., Greenhalgh, P., Prasad, D., Salagrama, V., Simon, G., Supkar, R. and Vivekanandan, V. (2003) *Report on Final Workshop on Globalization and Seafood Trade Legislation: The Effect on Poverty in India; 23–24 January 2003, Visakhapatnam, Andhra Pradesh, India.*

Campbell, J. (2000) Literature Review: The Utilization of Marine Fish and the Sustainable Livelihoods of the Poor in India. Project Memorandum, Sustainable Coastal Livelihoods Project India. (unpublished)

Carney, D. (ed.) (1998) Sustainable rural livelihoods: what contribution can we make? Papers presented at the *Department for International Development's Natural Resources Advisers' Conference, July 1998*. London: Department for International Development.

Chambers, R. (1994) The origins and practice of Participatory Rural Appraisal. *World Development,* **22** (7): 953–969.

Chowdhury, I. U. (2002) Institutional and socio-political context of coastal fishing communities in Bangladesh. Paper presented at consultation workshops on *Fish Distribution from Coastal Communities – Market and Credit Access Issues*, *22–23 July 2002, Chittagong, and 25 July 2002, Dhaka, Bangladesh*. Kleih *et al.* (eds).

CMS (2002) Globalization and Seafood Trade Legislation: The Effect on Poverty in India. Final Report for Orrisa; Project Report. Bangalore: Cirrus Management Services. (unpublished)

DFID (1997) *Eliminating World Poverty: A Challenge for the 21st Century*. White Paper. London: Department for International Development.

DFID (2000) *Eliminating World Poverty: Making Globalization Work for the Poor*. White Paper. London: Department for International Development.

DFID (no date) *Sustainable Livelihoods Guidance Sheets*. London: Department for International Development.

Holtzman J. S. (2003) *Rapid Appraisals of Commodity Sub-sectors*. Abt Associates Inc., Bethesda, MD, USA. (located on World Bank website)

ICM (2002) Research Project on Globalization and Seafood Trade Legislation: The Effect on Poverty in India. Final Report for Andhra Pradesh; Project Report. Kakinada: Integrated Coastal Management. (unpublished)

Kleih, U., Alam, K, Dastidar, R., Dutta, U., Oudwater, N. and Ward, A. (2003) Livelihoods in Coastal Fishing Communities, and the Marine Fish Marketing System of Bangladesh – Synthesis of Participatory Rural Appraisals in Six Villages, and Assessment of the Marketing System. Chittagong: Community Development Centre/Chatham, UK: Natural Resources Institute. (unpublished)

Kleih, U., Alam, K, Dastidar, R., Dutta, U., Solaiman, Md., Chowdhury, I. U., Nurul Kareem, A. N. M. and Ward, A. (2002) Report on consultation workshops on *Fish Distribution from Coastal Communities – Market and Credit Access Issues*, *22–23 July 2002, Chittagong, and 25 July 2002, Dhaka, Bangladesh*.

Marsland, N., Wilson, I., Abeyasekera, S. and Kleih, U. (2001) Combining quantitative (formal) and qualitative (informal) survey methods. *Socio-economic Methodologies for Natural Resources Research. Best Practice Guidelines*. Chatham, UK: Natural Resources Institute.

Miles T. (2003) *Agribusiness Sub-sector Assessments*. Development Alternatives Inc. Bethesda, MD, USA. (located on World Bank website)

NRI (1996) Participatory Rural Appraisal – A Manual on Issues, Principles, and Tools. Chatham, U.: Natural Resources Institute. (unpublished)

Nurul Kareem, A. N. M. (2002) Fish marketing system from coastal areas of Bangladesh. Paper presented at consultation workshops on *Fish Distribution from Coastal Communities – Market and Credit Access Issues*, *22–23 July 2002, Chittagong, and 25 July 2002, Dhaka, Bangladesh*. Kleih *et al.* (eds).

Oudwater, N. (2001) The sustainable livelihoods approach and its relevance for fish marketing. Paper presented at the workshop on *Poverty Alleviation and Livelihood Security Among the Coastal Fishing Communities – Market and Credit Access Issues, Chittagong, 27–28 March 2001.*

Oudwater, N., Greenhalgh, P. and Clucas, I. (2002) Globalization, Seafood Industry, and Livelihoods; Project Report. Chatham, UK: Natural Resources Institute. (unpublished)

Pretty, J. N., Guijt, I., Thompson, J. and Scoones, I. (1995) *Participatory Learning and Action: A Trainer's Guide*. London: International Institute for Environment and Development.

Scarborough, V. and Kydd, J. (1992) *Economic Analysis of Agricultural Markets: A Manual.* Chatham, UK: Natural Resources Institute.

Sherington, J. (1997) Statistical Concepts in Research (prepared for NRI's Grain Storage Management Course). Chatham, UK: Natural Resources Institute. (unpublished)

SIFFS (2002) Globalization and Seafood Trade Legislation: The Effect on Poverty in India – A Case Study of Kerala State, India; Project Report. Trivandrum: South Indian Federation of Fishermen Societies.

Solaiman, Md. (2002) Fishing communities: credit and gender issues. Paper presented at consultation workshops on *Fish Distribution from Coastal Communities – Market and Credit Access Issues*, *22–23 July 2002, Chittagong, and 25 July 2002, Dhaka, Bangladesh*. Kleih *et al.* (eds).

Theis, J. and Grady, H. (1991) *Participatory Rapid Appraisal for Community Development.* London: International Institute for Environment and Development/Save the Children Federation.

Wandschneider, T. (2001) Paddy, Fish and Vegetable Marketing Systems in Northwest Bangladesh – Current Situation and Opportunities for Intervention. Consultancy report prepared for CARE Bangladesh. Chatham, UK: Natural Resources Institute. (unpublished)

Selection of websites

General livelihoods-related websites	http://www.dfid.gov.uk http://www.livelihoods.org http://www.undp.org/sl
Sub-sector analysis-related sites/pages	http://wbln0018.worldbank.org/essd/essd.nsf/Agroenterprise/agro_guide http://lnweb18.worldbank.org/essd/essd.nsf/Agroenterprise/subsector_assess
Selection of general fisheries-related websites	www.globefish.org/index2.htm www.fao.org/fi/default.asp www.fis.com
EU Sanitation home page	europa.eu.int/comm/dg24/
EU Veterinary Inspections – Reports	europa.eu.int/comm/food/fs/inspections/vi/reports/index_en.html
EU Sanitation directives	forum.europa.eu.int/Public/irc/sanco/vets/home
Lists of establishments	forum.europa.eu.int/irc/sanco/vets/info/data/listes/table0.html
Eurostat – Statistical Office of the European Commission – main access page	www.europa.eu.int/comm/eurostat/
Centre for the Promotion of Imports from Developing Countries	www.cbi.nl
International Association of Fish Inspectors	www.iafi.net/
HACCP Training Programs and Resources Database (USDA)	www.nal.usda.gov/fnic/foodborne/haccp/index.shtml
USFDA – Fish Encyclopedia	www.cfsan.fda.gov/~frf/rfe0.html
National Marine Fisheries Service	www.st.nmfs.gov/
US FDA/Center for Food Safety and Applied Nutrition (CFSAN)	vm.cfsan.fda.gov/list.html
Australian Food Safety Web	www.safefood.net.au/index.htm
China Fishery home page	www.lib.noaa.gov/china/chinafp.htm
Standards and Regulation in Japan	www.jetro.go.jp/se/e/standards_regulation/index.html
FishBase – A global information system on fishes	www.fishbase.org/
Codex Alimentarius Commission – main page	www.codexalimentarius.net/
Southeast Asian Fisheries Development Center	www.seafdec.org/

The Sustainable Livelihoods Approach and its Relevance for Fish Marketing[5]

Appendix 2

This appendix provides an overview of the key elements of the Sustainable Livelihoods Approach (SLA) from the viewpoint of coastal communities and those engaged in the fish distribution chain.

The ultimate goal of Sustainable Livelihoods (SL) is to maintain an income, to minimize social exclusion, achieve social equity and a long-term productivity of natural resources without undermining livelihoods or compromising livelihood options open to others.

In the White Paper on International Development 1997, DFID outlined its commitment to poverty reduction through policies and actions promoting:

- Sustainable Livelihoods
- education, health and opportunities for the poor
- protection and better management of the natural and physical environment.

From this policy objective of elimination of poverty, DFID has worked towards developing a conceptual and operational framework that constitutes the Sustainable Livelihoods Approach. Promoting the SLA within current development thinking is seen as a means of addressing the ultimate target of poverty elimination. Many NGOs such as Oxfam and CARE have contributed to the development of the SLA by adopting it at an early stage and providing critical feedback and suggestions based on their ideas and field experiences.

Definition and Principles Underlying the Sustainable Livelihoods Approach

A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with, and recover from, shocks and maintain or

Box A1: The three dimensions of Sustainable Livelihoods

In sum, there are three dimensions to Sustainable Livelihoods (SL):

- an objective supporting the goal of poverty elimination
- a framework for thinking about poverty
- an approach for addressing poverty (the most important dimension)

SL is NOT:

- a panacea for poverty eradication
- a blueprint to guide implementation of programmes or projects targeting poverty

[5] Based on Oudwater (2001).

enhance its capabilities and assets, both now and in the future, while not undermining the natural resource base (Carney, 1998).

In this context, poverty-focused development activities should be:

people-centred – the emphasis is on people, not on resources *per se*: it mainly focuses on people and livelihoods at the micro-community level (e.g. coastal fishing communities) and at higher policy and planning levels (e.g. local and central governments and NGOs)

holistic – it is important to look at all the different resources, opportunities and constraints that people face in pursuing and improving their livelihood strategies (e.g. fishing, and also other income-generating activities)

dynamic – it is important to recognize that livelihoods are changing in response to external shocks and trends (e.g. declining fish stocks, seasonal fluctuations in supply and demand), and it is necessary to understand these changes, how the people themselves perceive these changes and how they have adapted their livelihood strategies in response to these changes

building on strengths – the approach starts with an analysis of strengths and resources rather than a list of constraints and needs

linking macro-micro levels – the approach attempts to bridge gaps and makes explicit links, for example, on the effects of national policies on local fishing and trading communities

conducted in partnership – with local organizations such as NGOs and government, and with donors

sustainable – people should be able to deal with, and respond to, external shocks, hardships and trends, and not be (entirely) dependent on outside support: there are four different interrelated dimensions of sustainability:

i) economic (e.g. supply and demand for fish)
ii) institutional (e.g. a well functioning fish marketing chain, availability of credit and loan facilities)
iii) social (e.g. support from within the family and the community in general)
iv) environmental (e.g. fish stocks).

Box A2: Summary of Sustainable Livelihoods Approach's principles

What the approach emphasizes:

- a people-centred participatory and responsive approach to development
- starting with positives (what people have) and opportunities (what they can make of it)
- building on existing development approaches
- micro- to macro-policy influencing

What the approach does not emphasize:

- starting with sectors or commodities
- starting with needs and problems
- replacement of existing development approaches (but sets them in broader context)
- a focus only on local development

The Sustainable Livelihoods Framework

The SLA is a way to understand the needs of the population and identify key opportunities that will ultimately benefit the poor. It is important to note that it is not an ultimate blueprint to guide the implementation of programmes or projects targeting poverty.

The SLA embraces a wider approach to people's livelihoods by looking beyond income-generation activities in which people engage. Through participatory approaches, it seeks to encourage various stakeholders, with their own perspectives, to engage in these discussions and debate the factors affecting their livelihoods.

Capital assets

Capital assets are resources that help people survive and thrive. The main capital assets are natural, human, social, physical and financial capital (e.g. fishing skills, aquatic resources, social relations, access to credit, infrastructure, etc.). Assets are important in terms of quantity and quality. In addition, the question is how do men and women access these assets and what is the extent of their control, rights and security of access. Although it is not possible to define a 'minimum' level of assets needed for survival, as the categories are highly subjective and location-specific, it is obvious that the better people's overall asset status is, then the better they will be able to respond to changes and face hardships. The following sub-sections outline the main characteristics of capital assets.

Human capital

Human capital represents resources such as skills, knowledge, ability to work and good health. Access to a combination of these elements is a prerequisite for making use of any of the other four capital assets. For example, before a fisherman can get a good catch, he needs to know the location of the fishing grounds, how to judge weather conditions, how to operate a boat, and how to maintain and produce the necessary fishing equipment such as fishing nets, boats and engines. Those involved in the marketing chain need to know how to assess the quality of fish, how and where to market the fish, how to negotiate good prices and what types of fish are in demand with which type of customers. Again, others involved in the processing of fish need to have profound knowledge on how to dry/smoke or salt fish to ensure good quality products to attract customers. People coming from a fishing background (e.g. fishing has been the traditional occupation of their family for generations), have a clear advantage as they learn while they are young and can get information and support from their parents, relatives and/or other community members. People coming in from a different area or family are disadvantaged, as they have to work their way in and probably have to learn the hard way, by learning from their mistakes.

Good health is important for people to be able to engage in fishing or marketing activities, as these

Box A3: The key elements of the Sustainable Livelihoods Approach framework

The key elements of the SLA framework are:

- capital assets: resources that help people survive and thrive (i.e. natural, social, human, physical and financial capital)
- vulnerability context: things to which the poor are vulnerable
- policies, institutions and processes: influence on their livelihoods
- livelihood strategies: how people adapt and plan in response to threats and opportunities
- livelihood outcomes and aspirations: what are people's objectives and priorities?

require physical fitness. Formal education might not necessarily be important for engaging in fishing activities as such, but it is a positive asset as it increases one's ability to engage in alternative income-generation activities if needed. This might be valuable in case the activity is highly seasonal, or worse, catches are declining because of overfishing forcing people to look for alternative sources of employment.

Natural capital

Natural capital is the quality and quantity of natural resources that are available to people and above all, the access and control people have over these natural resources. Examples include aquatic resources, water, land, forests, air quality and biodiversity. These resources often form the basis of most rural economies.

People living in coastal fishing communities, not only depend on fish but on a combination of natural resources for their livelihoods. Fish is caught for both household consumption and sale, generating a cash income. Waterways are also used for transport of persons and produce. Freshwater is used for human consumption and for preserving fish (e.g. brine). Forests provide both building materials for housing and boats and also fuelwood for cooking and smoking fish. In some areas, non-timber forest products can be important as an alternative source of natural fibres (e.g. traditional net mending, fishing traps and baskets), edible fruits, leaves, fungi and medicinal herbs. Access to land can be important, especially if fishing is a seasonal activity, because agricultural activities can supplement the household food requirements. Land is also important for processing activities such as drying fish.

In general, it can be said that fish is the key resource for survival. Unfortunately, there are many examples where fish resources are declining, both in quantities and quality (diversity of species). In addition, coastal fishing communities often lack access to land and, therefore, they have limited opportunities for seeking alternative livelihood strategies. In Bangladesh, fishers often belong to a Hindu caste, for example, the *Jaladas*. The *Jaladas* usually do not have land and their traditional occupation is fishing. Increasingly, there is an influx of people who have lost their land and perceive fishing as a kind of last resort (Alam, 1996).

Social capital

People are dependent on social resources for their livelihood strategies. Social resources are determined by relationships and networks, which exist within nuclear and extended families, and in and among communities and groups. These social relations influence the way in which people can access and make use of their assets.

Social relations are often based on trust, reciprocity and exchange, and contribute to a sense of well-being and belonging. Such informal social relations form the basis of informal safety nets, which people use to pursue their livelihood strategies in times of problems and emergencies. To enter a fishing business, a young man might be taken on board by his father or other relatives and be given/loaned fishing nets. In order to ensure a good and regular supply of fish, fish traders often rely on their relationships with fishers or other traders, sometimes based on kinship and/or mutual trust. Having a good relationship with a supplier opens up opportunities for obtaining fish on credit. Alternatively, newcomers to the fish trading business may need to be introduced to the market, its suppliers and/or customers by fellow traders. There are also examples where fishers, fish processors and traders share resources. Fishers who share boats, engines and eventually fishing nets are often brothers or father and sons. Fish processors might share the use of smoking/drying equipment and rent transport on a joint basis to reduce costs and waiting time.

The type and relevance of social capital can differ considerably among ethnic groups, gender and age. A woman can have limited opportunities for entering particular income-generating activities.

In some societies, women are not allowed to engage in activities outdoors but are confined to the domestic sphere, thereby increasing their dependence on their husbands or male relatives. Marital status can also influence one's choice of opportunities for potential livelihood strategies. A married woman often enjoys greater security than a widowed or divorced woman. For example, in Hindu fishing communities, the female-headed households (often widowed) often enter the fish processing and trading business as a survival strategy, whereas married women are more likely to be supported by their fishing husbands.

Another important aspect of social capital is ethnicity and/or religion. The caste system, which is characteristic of the Hindu religion, is prevalent in many coastal fishing communities in Bangladesh. Traditionally, castes are specialized in particular professions, which can be seen either as protective towards an individual's livelihood strategy as it hinders outsiders from entering, for example, the fishing profession. However, it can also be seen as a constraint as it limits people's opportunities for seeking alternative employment strategies outside their traditional occupation (Alam, 1996; Blowfield and Haque, 1995). However, there seems to be a growing tendency towards overcoming confined traditional caste boundaries and outsiders entering new occupations, for example, landless Muslim families, originally farmers, becoming involved in fishing-related activities (Campbell, 2000; Alam, 1996).

From previous examples, it is clear that there are also negative aspects of social relations, such as exclusivity, hierarchy, obligations and enforcement of power that can affect an individual's access to social capital negatively. Belonging to a lower caste can marginalize particular groups, leaving them more vulnerable to the more powerful castes and/or socio-economic groups within the community or wider society.

Social capital can also manifest itself in more formal ways through organized groups, such as trading or fishing associations, membership of religious groups or groups initiated by external facilitators like NGOs focusing on community development. If formally organized groups build upon strong informal social relations, they can lay an important foundation for influencing policies beyond community levels, knowledge sharing, community-based management initiatives or improving individual access to financial services.

Financial capital

Financial capital refers to the financial resources which are available to people (savings –liquid/illiquid, supplies of credit and regular remittances/pensions), and which provide them with different livelihood options. It also includes illiquid resources that can be quickly converted into cash and more liquid means. In some societies, there is a preference for saving in kind as that is perceived as having a higher value or being less risky than cash. Examples are jewellery (gold) and cattle, which are often disposed of in emergencies such as illness, marriage or death.

Financial capital is the most versatile type of asset as it can be used to acquire other types of capital such as:

- natural capital – access to land or purchase of fish for trade/processing
- physical capital – access to fishing equipment, modes of transport, house, etc.
- human capital – access to education and/or vocational training to support access to alternative sources of income.

Financial capital can also improve one's social capital as a high socio-economic status often correlates with having power and being respected/feared by others. For example, having good financial assets could enable a person to give loans/credits to those less endowed, thereby creating obligations for these dependants. Moneylenders are often feared/respected within the village because the poor depend on them for survival. Thus, the more wealthy people can use their higher level of social capital to their benefit,

for example, access to free labour or political power (vote buying).

Financial capital can also be used for supporting livelihood outcomes directly as people can use cash to buy food for meeting household consumption requirements.

Credit, both informal and formal, is an integral part of financial capital although, of course, raising credit always corresponds to a neutralizing debit. Informal credit, such as assistance from financially better-off relatives and friends, loans with local moneylenders or credit in kind, especially important for traders, can improve one's ability to pursue livelihood strategies. As fishing is a highly seasonal income-generating activity, incomes for both fishers and traders tend to be irregular and season-based. Therefore, fisherfolk face occasional shortages of cash to meet their household requirements, particularly during the lean season. Access to informal credit for both production and consumption purposes can be an important coping strategy as that allows people to prepare, invest and work in their preferred occupation. Formal credit institutions, such as banks and NGOs, seem to stipulate requirements that sometimes do not recognize and meet the need and priorities of fishing communities, for example, a regular income, ownership of collateral, targeted at production purposes and favourable to group membership.

Although, informal credit through local middlemen is often seen as exploitative, it has the advantage of being flexible (no discrimination between consumption and production credit), timely and easily accessible as it is locally available with little bureaucratic hassle. In addition, fishers are secured of buyers for their daily catch without having to spend a lot of time trying to sell to several smaller buyers. Alam (1996) mentions that moneylenders also provide an element of social security by protecting the often socially marginalized groups against violence from other more powerful groups, (e.g. due to religious or trade rivalries).

However, it is often perceived as exploitative as fishermen are obliged to sell the major share of their daily catch to the moneylender below the market price, therefore, it is almost impossible to get out of the vicious circle of indebtedness. This also hinders other groups such as traders and fish processors who wish to enter the market as fish supply might be limited at times and they have to compete against large-scale operators (Campbell, 2000; Blowfield and Haque, 1995).

Physical capital

Physical capital is the basic infrastructure such as transport, shelter, sanitation, water, energy and communications, and the production equipment and means which enable people to pursue their livelihoods. It includes public goods such as health care, education and infrastructure, like roads, for which people often do not have to pay directly or partly contribute (e.g. payment of school or hospital fees). Having good access to infrastructure can be especially important for traders as it increases their potential marketing area. Access to health services, safe water supply and sanitation will make a positive contribution to people's health, thereby increasing people's human capital and ability to work.

Also private goods, such as fishing gear, boats, engines, fishing nets, fish processing equipment (ice boxes, smoking ovens, drying racks/slabs) and modes of transport are crucial to support livelihood strategies. Not all fishermen have their own fishing gear, and they might depend on borrowing or using others' equipment in return for payment of rent or lower cash returns for their catch. Having a lot of physical capital does not necessarily mean that someone is better-off. For example, a fisherman owning a motorized boat might be heavily indebted because of outstanding loans, and he might actually have a lower return on his investment than those who own nets but no boats and, therefore, pay for the use of a boat.

Livelihood assets pentagon

A pentagon is sometimes used as a visual tool to present information about people's access to

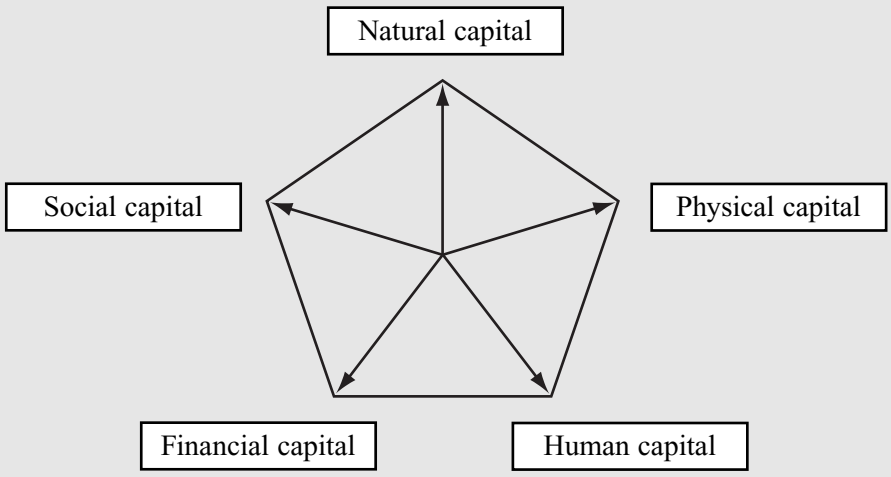
assets and the interrelationships. The different types of assets are presented in the shape of a pentagon. Access by different groups or households to each different type of asset can be plotted in a schematic way along the five axis graph (see Boxes A4 and A5 below). As discussed earlier, access can imply anything from individual ownership of private goods to customary rights for groups. Values or length of axis are not quantified, as values for each asset base are highly subjective, because they are location- and context-specific. It is used as a starting point for thinking about how and in what combinations, assets translate into sustainable livelihoods. It can also provide an analytical tool for tracking changes in people's asset base over time and/or drawing comparisons between geographic areas.

Further, it highlights the interrelationships between the different capital assets and the extent to which they are interchangeable. For example, natural capital may be the basis for financial capital (land as collateral that can be used to obtain a loan). Or natural capital might be linked to social capital. In many societies, investment in a large number of livestock is associated with social prestige and provides a basis for kinship support. Financial capital correlates often with socio-economic status and the ability to develop dependency relations, creating both obligations and benefits, thereby increasing the individual power base and decision-making power. Financial capital can be converted into physical capital through purchase of fishing nets and fish processing equipment, etc. Access to physical assets again links to human capital, such as being able to invest in human health and education, increasing a person's ability to seek alternative employment opportunities.

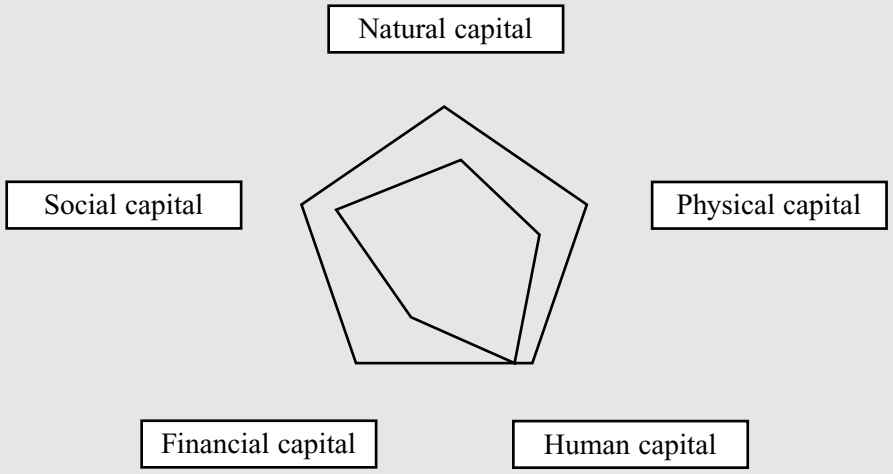
A simplified example is presented in Box A5, and illustrates how a fisherman's balance of assets can change over time as a result of declining catches.

Natural capital is reduced due to a decline in fish resources causing reduced catches per unit and reduced supply of fish to the markets. Due to an increase in pressure on nearby forest resources, access to firewood has become scarce and, therefore, less available for household use and fish processing. Human capital has remained rather consistent as the person is still physically fit and has all the knowledge and skills needed for fishing. Financial capital has decreased, because incomes from fishing have gone down due to the decline in catches, even though the

Box A4: Livelihoods assets pentagon



Box A5: Example of how changes in assets can be analysed and presented



prices may have increased. Therefore, the person depends more on informal loans to meet household needs, thereby reducing his social capital, as he has become more dependent on other people for assistance, rather than being able to assist others in return for favours beneficial for him. His physical assets have declined as his fishing nets were damaged in the previous fishing season and he does not have sufficient cash to replace them with good quality ones. Instead he relies on mending his old nets, which become even more prone to damage, thereby reducing the volume of fish caught and increasing the time spent repairing the nets after coming back from sea.

The above example gives an idea of the changes over time and how the asset status is affected. Has it improved or decreased? What changes in asset status can be predicted given the current changes and the impact on the asset status as identified in the above case? What are the main causes of change and how does it vary for the different social groups (e.g. in terms of socio-economic status, gender, age and ethnicity)? Such an analysis of causes of change can help in identifying the factors that enable people to move out of poverty, and develop an understanding about the combination and sequencing of assets and livelihood strategies which allow them to do so.

Vulnerability

Next to an understanding of people's strengths and access to assets, it is important to understand the vulnerability context in which these assets exist. What are the external factors that influence the levels of assets and how these assets can be used? These external factors are often related to the causes of poverty, which make poor people, in particular, vulnerable. For many poor rural people, changes in natural capital can particularly affect their vulnerability, as they are heavily dependent on natural resources. Three major types of external factors can be recognized: trends, shocks and seasonality.

Trends

There is a major long-term negative trend in relation to the quantity and quality of natural resources. Over the past decades, fish resources have declined and particular species have become extinct or prone to extinction. The loss in biodiversity may have negative drawbacks on the remaining resources as the marine ecosystem has been disturbed. The underlying causes for the increased pressure on natural resources are rather complex, but two important ones are rapid population growth and urbanization. A few examples of interrelated sub-trends are:

- pollution of water resources, for example, industry, mining, urban development, agriculture and aquaculture (use of pesticides and fertilizers)
- habitat destruction through aggressive fishing methods and clearing of natural vegetation such as mangroves, land loss through inappropriate watershed management
- growth of export market: increased demand for high value fish has resulted in extractive fishing methods and a greater uptake of mechanized fishing technologies, thereby adding pressure on natural resources. It also pushes out the already marginalized, poor fisherfolk, who are not able to invest in capital-intensive fishing technologies.

Other institutional-related trends include liberalization of trade, introduction or lifting of trade bans, and change in consumer preferences. For example, the demand for fresh fish has increased significantly, stimulating the use of preservation technologies such as the introduction of ice. This may have a negative impact on the livelihoods of small-scale fish processors who rely on traditional low cost preservation technologies, such as sundrying, salting and smoking.

Shocks

Shocks are unpredictable events affecting livelihoods such as war, natural disasters such as floods, droughts, cyclones, earthquakes, landslides, disease epidemics and sudden economic changes (e.g. currency devaluation). In the fishery context, cyclones and floods have a devastating effect on people's lives and properties. Many lives are lost (loss in human capital), and physical infrastructure and assets are wiped out, such as loss of fishing gear, roads, bridges and transport linkages being washed away, thereby again limiting access to health and education services and employment opportunities in other sectors. A decline in the availability of natural resources and loss of biodiversity makes events such as cyclones and floods unpredictable, more common and worst of all, the effects on people's livelihoods have become more severe. Loss in biodiversity has negatively affected nature's ability to resist natural disasters. Due to deforestation of mangrove forests, the natural protection against floods has become minimal. In addition, the loss of biodiversity reduces people's ability to cope with disasters as building materials become scarce and income from fishing declines, therefore limiting people's capacities to build up a buffer zone against such calamities.

Seasonality

Seasonality includes recurrent changes throughout the year that influence people's access to assets and livelihood outcomes. Seasonal change in weather is such an example. The major fishing season may occur during the rainy season, thereby limiting cash income to a few months a year, imposing a strain on the household cash flow and food security during the lean season. Because most of the fish may be caught during the rainy season, there is a greater risk for those involved in fish processing due to higher humidity and higher prevalence of insect attack on the processed fish. Also transport of fresh fish might be more unreliable in the rainy season as roads may become flooded. Other aspects of seasonality include changes in prices, marketing opportunities, health (e.g. higher risk of malaria during the rainy season) and availability of alternative employment opportunities.

In sum, if people are unable to deal with these trends, shocks and/or seasonal changes, they will become increasingly vulnerable. It is important to keep in mind that the vulnerability context can differ among the different social groups as the levels of vulnerability are related to their individual combination of assets available and accessible to them. The vulnerability context can be best explored through an examination of perceived risk factors, key problems, changes, potential solutions and the coping strategies that people have developed. Policy interventions may

be required to prevent people from becoming more vulnerable and, therefore, unable to cope with shocks, trends and seasonal changes.

Policies, institutions and processes

As mentioned earlier, one of the key principles of the SLA is the attempt to link micro- and macro-levels: the household/community level with processes initiated by government, the private sector and NGOs. There is a two-way influence between assets and policies and institutions. Existence or lack of policies can have important effects on the livelihoods of the poor. Changes or transformations in these policies and institutions can be used to mitigate negative effects of trends on overall asset status and cushion the impact of shocks and seasonality, thereby reducing people's vulnerability.

Rules of access to natural resources will influence people's access and control over natural capital. The marine fishery is considered a common property, which means it is shared amongst those who fish it. A common problem associated with common property resources is the 'free rider' problem, as individuals benefit from use of the resources but do not bear the full opportunity costs of their use of common resources. In general, there is a tendency towards short-term gains rather than an attempt to manage the natural resources in a sustainable manner as benefits might be reaped by others who have not made any investment in such sustainable resource management efforts. Consequently, many marine fishing grounds are considered to be overexploited. Not only fishers will be negatively affected by the loss of fish resources, but also those involved in the marketing chain and many coastal families as they depend on fish as an important source of animal protein. Among policy-makers there has been an increasing awareness of the need to devolve user rights to lower levels, such as communities, to encourage sustainable resource management.

Overfishing is further triggered by the greater uptake of highly mechanized fishing technologies. This may be in response to demand for high value fish on the global market, making the fishing sector more attractive for high capital investments. Consequently, artisanal fishers may be pushed out of the marine fishery, as they cannot afford to invest in new mechanized fishing methods. Present fishing methods may damage fish resources, such as the indiscriminate use of trawlers and small mesh gear. It is suggested that policy-makers work towards strengthening the management structures, designing an international legislation for the fishing industry, and trying to protect the fishing areas for local stakeholders, rather than the multinational fishing industry. Legislation could embrace a fishing ban during the breeding season of endangered and commercially important fish species and regulations concerning the use of fishing technologies.

Extension services targeted at post-harvest activities can improve fish traders' and fish processors' awareness and skills to reduce post-harvest losses during fish processing and storage. As a result, incomes will increase due to a greater amount of processed fish available for sale, and they are likely to get a better market price because of the higher quality of the cured fish.

Policies of organizations working within the coastal areas can also influence people's use and access to assets. Local organizations, either community-based or initiated by NGOs, may play a major role in representing the marginal groups within communities by identifying the key priorities and working towards the specific needs of these stakeholder groups. Some NGOs are involved in providing credit services to local poor communities. Each NGO may have its own selection criteria and repayment regulations. Most NGOs seem to provide credit for production purposes only, such as purchase of agricultural inputs or fishing nets, and require regular instalments. However, the fishing sector is highly seasonal and requires a large capital

input at the onset of the major fishing season. The amount of money needed might be more than the maximum amount of credit. Further, fishers might not be able to meet the regular instalments as their income is highly seasonal and subject to considerable fluctuation. In addition, most fishers need credit to cover household consumption needs during the lean season when their incomes are non-existent or insufficient. Most financial service providers appear not to allow credit for consumption purposes, therefore excluding fisherfolk from access to financial resources. Consequently, fisherfolk are dependent on informal loan arrangements with local moneylenders and/or local business men. This often means lower incomes during the fishing season, as they are obliged to sell a major share of their catches to the moneylender to repay the loan in 'kind'. If NGOs and/or financial service providers were able to adjust their credit policies to suit the specific requirements of the fisherfolk, then the fisherfolk might be able to free themselves from a vicious circle of indebtedness.

Given the context of such bond credit relations within the fish marketing chain, market information might be distorted as market prices are relatively fixed and set by moneylenders, which often do not reflect the real market value. This has a negative impact on other fish traders who have to buy at a higher price, but are forced to sell again at a relatively low price as they have to compete with traders obtaining goods below the actual market price. In case they are competing for the same market, a market concentration will occur with moneylenders controlling bigger shares of the market.

The above examples mainly relate to the way formalized institutions and policies are influenced by, and affect people's asset status. However, informal processes such as cultural practices, power relations and (traditional) beliefs can also play a significant role in the way in which assets are transformed into livelihood outcomes, for example, in a Hindu society, the type of occupations is closely related to caste boundaries.

Livelihood strategies

Livelihood strategies are the range of outcomes depending on how people combine and use their assets to make a living given the factors that make them vulnerable and the policy and institutional context within which they live. In the past, development efforts often sought to improve services and opportunities available to categories of people, such as fisherfolk. However, the SLA seeks to develop an understanding of the factors behind people's choice of livelihood strategy and to reinforce the positive aspects and mitigate the constraints or negative influences. In sum, the SLA seeks to identify ways of building on the strengths the people have, while at the same time trying to reduce the level of vulnerability.

Inherent to its holistic principle, the SLA recognizes the importance and prevalence of a diversity of livelihood strategies that an individual and/or household pursues. Poor people and their households have often diversified their range of livelihood strategies in order to reduce their vulnerability and to be able to cope with uncertainties or lack of sufficient income from one major income-generating activity.

Through a social stakeholder analysis, it is crucial to identify the different social groups/communities as they might each have their own opportunities and constraints that determine their livelihood strategies. Within the fish distribution and marketing chain, there might be different groups of traders, each involved in a particular part of the marketing chain given their ability to combine the assets available to them. For example, women, who have little trading capital and are dependent on an irregular supply of fish, are mainly involved in buying leftovers and low quality fish brought to the landing sites, which they sell in the local neighbourhood. Others with a higher operational capital and better supply channels of higher value

fish might sell at regional markets or in nearby urban markets.

Poor people's livelihood strategies may be more or less based on natural resources. Access to natural resources become increasingly limited, especially because of urbanization, and people have to seek alternative non-natural resource-based livelihoods. It is obvious that the range of livelihood choices is more restricted for the asset 'poor' than for those who have good access to all sources of capital. The fact that many fisherfolk are tied up in informal loans, which they need to repay, reduces their opportunities to move to alternative preferred livelihood strategies. Further, the prevailing culture, gender and caste restrictions can reduce people's choices of potential income-generation activities. In order to develop an understanding of why particular livelihood strategies might be followed and others not, it is useful to examine the constraints the poor people face in achieving local livelihood objectives.

Livelihood outcomes

People often aim for a range of preferred outcomes based on their perceived priorities and objectives, for example, income, well-being, food security, sustainable use of natural resources, reduced vulnerability and decision-making power. Through participatory poverty assessments, it is possible to develop an understanding of local perceptions and definitions of poverty, and what people themselves see as pathways out of or into poverty. Individual livelihood strategies might deal with different dimensions of poverty and aim for different outcomes. In the case of fisherfolk, access to consumption credit is an important mechanism to ensure food security and the ability to go fishing when the main season starts. In addition to exploring people's livelihood goals and preferred outcomes, it is also worthwhile getting an insight into the way people rank the outcomes of their livelihood strategies. Some fisherfolk, tied to local moneylenders through outstanding loans, might perceive it as exploitation and as a factor preventing them moving out of poverty as they cannot invest in alternative income-generating activities. Others might value the social security provided by the more powerful group within their community and accept the fact that they are limited in developing alternative livelihood strategies.

Further, social groups and/or individuals might value the trade-offs between immediate livelihood gains and longer-term losses differently, depending on the range of choices they have. Large-scale fishers might not be concerned by the decline in fish resources as they will have sufficient resources to invest in other livelihood strategies if required. However, artisanal fishers might have a stronger incentive to work towards sustainable management of fishery resources, as they are limited in taking up alternative livelihood strategies due to lack of access to assets and their vulnerability.

Conclusion

The focus of this section has been to summarize and explain the core elements of the SLA with specific references to the coastal fishing communities and their role in the fish distribution and marketing chain. The SLA framework can be a useful tool for analysing and understanding the broader context and sustainability of the livelihoods of people in coastal fishing communities. Only if an in-depth knowledge is generated of the complexity and dynamics of poor people's livelihoods in coastal fishing communities, can recommendations be made to strengthen people's livelihood opportunities, specifically focusing on improving access to markets and credit.

A wide range of tools can be used for data collection to support an analysis based on the SLA. It is suggested that a combination of participatory, qualitative and quantitative tools be used, such as:

- participatory methods borrowed from participatory rural appraisals (PRA)
- sample surveys including structured and semi-structured questionnaires
- institutional appraisal, including formal and informal access to credit
- identification and analysis of fish distribution channels
- market analysis and risk assessment
- social analysis
- gender analysis
- stakeholder analysis and conflict assessment
- participatory poverty assessment techniques
- case studies.

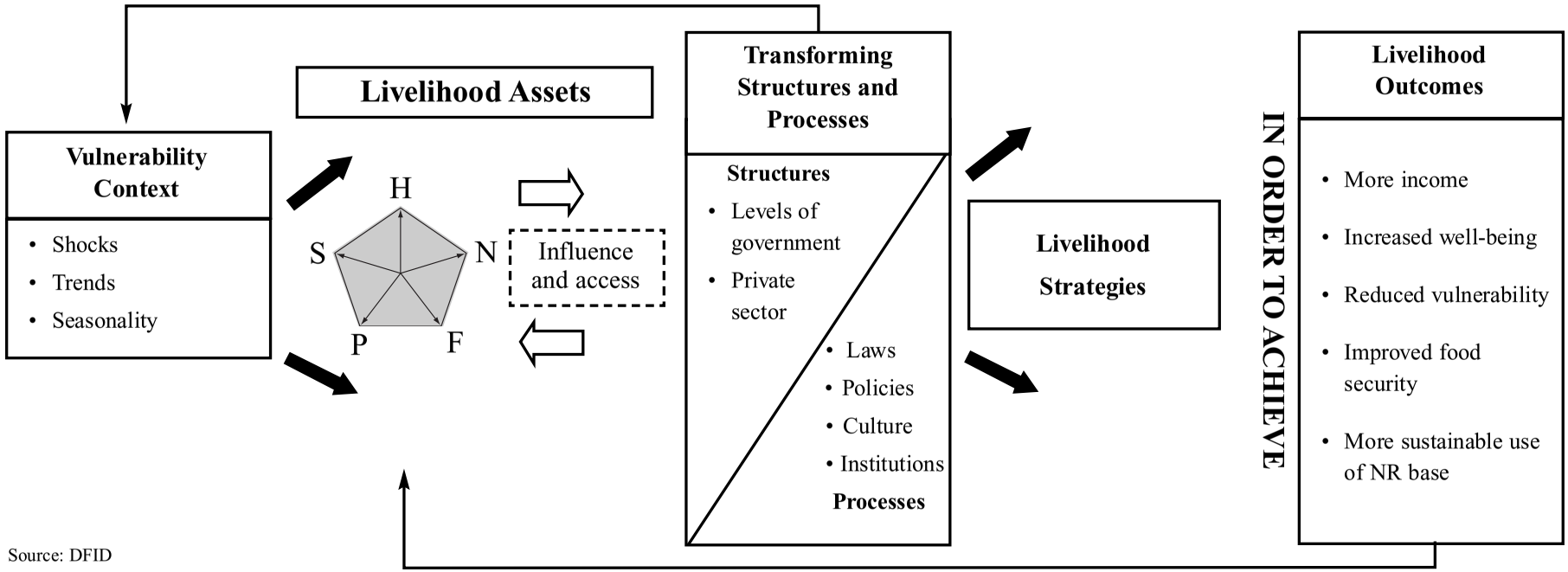


Figure A1: SLA framework

Steps in Sub-sector Analysis[6]

Appendix 3

The following sections highlight the principal steps of a sub-sector analysis.

Establish Initial Understanding

Step 1. Define sub-sector for study

This can be a very important step, even though in most instances the country and/or donor have already selected the sub-sector(s) to be studied. This was the case in the Morocco Agribusiness Promotion Project (MAPP), where USAID and the Government of Morocco identified eight sub-sectors to be studied prior to project implementation.

In some instances, the sub-sector will not be clearly identified or defined and data must be collected that provide an overview of those working in the agriculture sector. The objective of this overview is to identify sub-sectors where interventions are likely have the largest pay-off and lead to large-scale sustainable growth.

In order to obtain an overview of the sector, data should be collected that reflect the size of the different markets in the sub-sector, as well as growth prospects and target groups of those markets. Typical sources of data are population surveys, national accounts, labour force surveys, previous studies by multilateral banks and/or NGOs, consumption studies, trade statistics and key informants. Selection and definition of the sub-sector is generally made before any fieldwork, although some rapid reconnaissance may be conducted to fill information gaps or provide supplementary data.

Step 2. Familiarization with the sub-sector

Once the sub-sector(s) has been selected the principal functions, technologies, participants and product flows must be identified. The following questions should be answered:

- What are the main functions in the sub-sector?
- How does the product flow from raw material through producers and ultimately to the consumer?
- What types of technologies and scales of production compete in each function?
- At what points do small and large enterprises compete?

These questions can be answered through a combination of research and fieldwork. Participants, as well as knowledgeable observers, should be interviewed. Interviews can be open-ended or structured and should include the following questions:

- Where do you get your raw material?
- Who do you sell to?
- Who do you buy from?
- What technology do you use? Why?
- What changes have occurred in your industry?

[6] Taken from Miles (2003).

In addition, questions about prices, profits and returns can be asked. In Morocco, important information was obtained about the olive sub-sector by interviewing local participants, Spanish and French processors, the World Olive Council in Madrid and British and German brokers.

It may be useful here to roughly sketch a diagram of the sub-sector. First, it can be a useful tool for getting information. Many people may not be willing to give personal information, however, most will be more than willing to tell you where you are making incorrect assumptions. Secondly, it will provide a foundation for the preliminary sub-sector map.

Step 3. Draw preliminary sub-sector map

The map offers a useful overview by clearly illustrating the operational framework of the sub-sector. The information obtained during the research and interviews are diagrammed and the desired result is a graphic summary of the principal sub-sector functions, participants and channels. The map should illustrate the analyst's initial understanding of the sub-sector and serve as a guide through the next steps of the assessment.

The functions are listed down the left side, the final markets across the top, and the participants and alternative technologies for each function are drawn in according to the functions they perform. Arrows illustrate the product flows among the participants and three principal channels and enterprise boundaries are clearly defined.

Step 4. Specify environment

Once the sub-sector map has been diagrammed, the environment in which it exists and operates must be investigated. The environment consists of the formal and informal rules that affect the sub-sector, as well as the organizations that support them. Rules include labour regulations, trade policies, other macro-economic issues, and socio-cultural factors. Support organizations include trade associations, export agencies, ministries, chambers of commerce and NGOs. An improved understanding of how the environment affects the dynamics and competitiveness of the sub-sector can be obtained through dialogue with sub-sector participants and support organizations, as well as through the study of the formal and informal rules.

All interviews and research in this step should seek to answer one question: How does the environment affect the different channels in the sub-sector? For example, MAPP's 1993 olive sub-sector study found that Moroccan olive oil processors mixed extra virgin and virgin olive oil with acidic 'lampante' oil. Because of strong local market prices and a preference for higher acidity, the extra virgin and virgin olive oil was blended with the more-acidic lampante oil to extend lampante volume. Extra virgin and virgin olive oils were exported only in the years when there was a bumper crop. It was suggested that, rather than extend local lampante supplies by mixing with lower acidity oil, Morocco could import the less expensive grades of olive oil from countries such as Tunisia, freeing extra virgin and virgin olive oils for export on an annual basis. At the time, the Moroccan import policy kept foreign olive oil out of the market. Project staff determined that if the government let in foreign oil, Moroccan consumers could benefit from lower olive oil prices, and Moroccan producers could become regular suppliers to the international virgin olive oil market.[7] In 1995, the law was changed, granting licenses for the importation of lampante oil and eventually enabling the increased export of higher quality oil, thereby benefiting both domestic consumers and exporters.

[7] *Exporting The Right Stuff*. Agribusiness Marketing Investment/Development Alternatives Inc. Marketing Materials.

Refine your Understanding

Step 5. Refine sub-sector map

The objective here is to refine and simplify the map, by making appropriate changes and integrating the details obtained from step 4. If necessary, additional interviews can be carried out where there are unclear or insufficient data. This second round of mapping interviews should be conducted in concert with step 6; in addition to seeking clarifications and filling information gaps, a more concentrated effort should be made to collect reliable quantitative data.

The channels and sub-sector participants in the Moroccan strawberry sub-sector are clearly identified. Channel one shows large vertically integrated Northern growers that sell fresh and frozen berries. These growers have a minimum of 30 ha, producing 40–50 t/ha. About 50% of production is exported fresh, 25% is exported frozen and the remainder is sold in local markets. Channel two shows small growers, who produce almost exclusively for the domestic fresh fruit market. In channel three, large vertically integrated growers sell mostly fresh berries for export. While production in this channel is similar to channel one, 50% is exported fresh and 30–40% sold locally with the remainder sold to processors of jams and other products.

Step 6. Quantify 'overlays' of particular interest

As the map becomes more refined, it may be necessary to add detailed information to illustrate more clearly the dynamics of the sub-sector. Quantitative, as well as qualitative, detail can be added to the map through the use of overlays. An *overlay*, as defined by Haggblade *et al.* is information superimposed on to a basic sub-sector map to describe differences among participants and channels. The most common overlays used relate to size, income and its distribution, efficiency, leverage and target groups. When assessing the strawberry sub-sector in Morocco, it was decided that volume and values were the most important overlays to include.

There is no clear-cut method for determining which overlays to use. If information is important to the study and it has not been clearly reflected in the basic map, then it should be added as an overlay. Once the relevant overlays are determined, data must be collected in order to quantify them. Quantification at times will be approximate due to the accuracy of key informant estimates and their uneasiness about sharing this information. Data should be cross-checked with government, shippers and trade association sources to ensure consistency and minimize errors.

Identify Leveraged Interventions

Step 7. Analyse dynamics

At this point in the process, it is necessary to understand how the sub-sector is changing. The first step in analysing the dynamics of the sub-sector is to determine which channels are growing and which are declining. Once the growing and waning channels are identified, key driving forces and constraints can be examined to determine which are responsible for the growth or decline. Key forces that affect change in the sub-sector include: market demand, technological change, profitability of different niches, risk, barriers to entry, large firm behaviour, input supply and policies. Finally, the consequences of the growth or decline must be determined. Identification and understanding of the key forces driving change in the sub-sector and the consequences of that change will often reveal opportunities for growth.

In the strawberry sub-sector three key driving forces were identified.

i) The plants for planting. About 80–90% of strawberry plants were provided by Spain, the remaining 10–15 million plants were

provided by domestic growers. The Moroccan strawberry industry was overly dependent on Spain. Shortage or poor quality plants from Spain could seriously impair the industry. A clear opportunity existed for Moroccan growers to expand their sales of strawberry plants.

ii) Transport. Truck size was clearly a major force in the sub-sector. It took at least 30 ha of production to fill a refrigerated truck. Opportunities will be available for increased transport access to small farmers, if the transport system is modified to include smaller trucks.

iii) The markets. Higher prices are available for products that are ready earlier in the season. In Morocco, opportunities still exist for even earlier harvests by using improved technologies and strawberry varieties.

Step 8. Identify sources of leverage

Leverage is the ability to affect large numbers of sub-sector participants with a single, preferably low-cost, action. Points of leverage can be identified through system nodes, geographic concentration and policy constraints. System nodes are points where large amounts of the product pass through the hands of a small number of sub-sector participants. In the strawberry sub-sector, a clear system node existed between the production of strawberry plants and strawberry production. Increased domestic seedling production would assist Morocco to produce higher quality berries. A useful overlay used to represent system nodes is the 'gearing ratio', which illustrates the average number of participants in one function purchasing inputs from the function below it. Geographic concentration offers the opportunity for targeted interventions that reach many participants in the same region. Finally, policy constraints offer a powerful point of leverage. Policy reforms can have a large impact, although they can be difficult and time consuming to achieve.

Step 9. Explore opportunities for leveraged intervention

The objective of this step is to determine where opportunities for intervention (identified in step 7) and points of leverage (identified in step 8) converge. The following question should be answered: Which opportunities offer the best chance of reaching the largest number of participants within the sub-sector? After performing the assessment it may be determined that such opportunities do not exist; if so, efforts should be focused elsewhere. However, if opportunities for leveraged intervention do exist, they constitute the skeleton of the project design.

In the Moroccan strawberry sub-sector, plant seedling production was identified as an opportunity and the fact that most of the plants were provided by Spain was determined to be a source of leverage. The first step taken to leverage this opportunity was a Moroccan strawberry industry tour to the United States in 1995. A direct result of this trip was a joint venture between a Californian firm and a Moroccan company that created a high-altitude strawberry plant nursery for certified plant production. One million plants were shipped to Morocco and in the 1995/96 season they out-produced the Spanish plants at a lower cost.

Sample Sub-sector Report Outline

Executive Summary
- Introduction
- Dynamics in the Sub-sector
- Opportunities and Constraints
- Recommendations for Project Actions

I. Overview of Commodity Production
II. Markets and Consumer Demand
III. Structure of the Sub-sector/Sub-sector Map
IV. Environment
V. Driving Forces and Points of Leverage
VI. Opportunities and Constraints
VII Conclusions and Recommendations/ Opportunities for Intervention

India and Bangladesh Project Case Study Material

Appendix 4

Overview of globalization issues

Summary of findings from the India project

Summary of findings from the Bangladesh project

Commodity chain – Bangladesh

Seasonal diagram – Bangladesh

Calculation of costs and margins – Bangladesh

Positive and negative sides of *dadan* (informal loans) in the fish marketing system

Examples of tables produced by the University of Chittagong using questionnaire data

Positive and Negative Impacts of Globalization and International Seafood Legislation on the Fishing Sector Participants[8]

The following two sections review some of the positive and negative impacts that globalization and international seafood legislation can have on fishing sector participants in developing countries, with a particular focus on India. Not only are the issues complex, but also the range of experiences between countries, regions, individuals and fish types is diverse. For example, major opportunities have been created to increase incomes through export-led growth and the benefits of expanded international trade, as well as improved access to information, new ideas, technologies and institutional designs. However, there has often been a downside in terms of increased risks and greater economic and social instability at both the micro- and macro-levels, which may result in increased vulnerability of some stakeholders. These can have a profound impact on the livelihoods of small artisanal fishermen and processors, a large proportion of whom are already very poor.

Positive impacts

Expanded market opportunities

Globalization and liberalization offer participants in the fishing sector expanded market opportunities, but also require a more

[8] Taken from Oudwater *et al.* (2002).

commercial approach in pursuing market opportunities. Market liberalization of the sector predominantly favours producers who have competitive advantages (i.e. natural resources, skills and capital) that allow them to compete in both international and domestic markets. Alongside efficiency and redistribution effects, the change in price signals has led to longer-term changes to physical and human capital formation. This is often difficult to quantify since the full impact and consequences of the changes occur over the long term (and are influenced by a range of additional factors). Some of the more readily observable consequences of market reforms include a direct impact on production, trade and finance, particularly in export-orientated sectors. Frequently there is greater participation by private sector organizations, greater producer responsiveness to market needs – partly the result of improved market efficiencies and an increased producer's share of the fob price. We do not know at present how producer prices for seafood have changed in India as a result of market reforms and globalization, but there are many examples of export-orientated producers (e.g. coffee, cocoa and cotton) throughout the developing world that have substantially increased their share of the fob export price, although on occasions the fob export price has fallen as a result of increased output.

Increased capital flows

A positive impact of globalization has been the increase in international capital and technology flows. Moreover, these flows, which are often associated with direct foreign investments, are no longer restricted to North-South flows, but are increasingly taking place within and between countries in the developing world. However, this can be something of a two-edged sword, particularly for smaller producers, processors and traders, since not only can they lead to growing concentration, but also increased volatility and uncertainty. Hence there is the need for adequate regulation and appropriate investment and technology codes to protect both small-scale players and investors in the sectors and countries concerned.

Improved transport and communication infrastructure

Improvements in international transport (sea, air and road links) bring small-scale producers closer to the global market. Obviously, transport costs will invariably face fluctuating fuel prices, but the trend in recent decades has been that freight capacities have increased continuously alongside technological improvements. This enables exporters to bring larger quantities of better quality produce in a shorter time on to retailers' shelves in industrialized countries. Those involved in the trade in fish and other commodities are embracing the global revolution in information technology. E-mail, internet and mobile phones are increasingly replacing the less reliable and slower means of communication such as mail, fax and printed trade literature. Although resource-poor fish producers and processors may not be able to directly benefit from new information technology, they are bound to benefit from the improved flow of knowledge. More efficient trading practices are being adopted while research and extension services have better access to internationally held knowledge, information and databases.

Negative impacts

Increased market risk and price volatility

While globalization and liberalization may have increased market opportunities and small producers may receive a larger share of the export price, they have also resulted in greater market risk and increased price uncertainty and volatility. Small producers and various intermediaries are much more vulnerable to market risks. The balance between increased market opportunities and greater market risk will be situation-specific and impossible to predict. The degree to which liberalization/globalization has affected price volatility is still being debated. Increased price uncertainty and volatility has created difficulties as regards production and processing decisions, as well as the ability to purchase inputs and to obtain credit. Price risk is

only one of several risks faced by producers and other market participants. There are production risks, arising from seasonality of supplies, ecological stability (i.e. current decline in fish stocks worldwide) and diseases (i.e. shrimp aquaculture), and the lack of liquidity with which to buy fishing equipment and poor post-harvest management. On the marketing side, there are risks with regard to price, quality and quantity caused by price volatility, demand variations, and stringent sanitary and phytosanitary standards (SPS) requirements imposed by major buyers, particularly the EU, USA and Japan. Markets are becoming more resilient to price volatility in part because of the faster response to production and demand shocks. Nevertheless, volatility does create difficulties for producers and processors as regards production and processing decisions, the ability to purchase inputs and to obtain credit. It requires a high degree of flexibility and adaptability, thus those not able to adapt may lose out and be adversely affected. However, many small producers and processors are unaware of the wider nature of globalization and liberalization processes that are underway. Their perceptions are limited to the more immediate impact in terms of greater price uncertainty and volatility, and changes in demand and quality requirements. The impact of these changes depends on the extent to which small producers are capable of reacting to the new challenges they face.

Increased competitiveness

Competitiveness has invariably increased for producers selling to both international and domestic markets. Small-scale producers that lack comparative advantages are coming under increasing pressure in export markets from other regions that are better endowed with production factors. Policy changes and the reduction of international transport costs are contributing to this. At this stage, there is little information on the extent to which Indian fish producers are facing growing competitive pressures from local producers within India or from other producers both in Asia and elsewhere. Current SPS, as imposed by the EU, USA, Japan, the main importers of shrimp, have a significant impact on the competitiveness of producers as to who is able to invest in hygienic processing procedures to comply with these requirements.

Concentration and polarization

In line with increased competitiveness, there is a shift from small-scale production to larger-scale operations. For compliance with current SPS, companies need to invest considerable sums in upgrading fishing equipment, and processing and marketing facilities to ensure current and future export markets. Consequently, the scale of fishing has become more capital intensive, for example, large trawlers suitable for deep-sea fishing, specialized fishing gear and on board preservation facilities. Local small-scale processing plants in rural areas have closed down, and processing for export markets (i.e. peeling and deheading of shrimps) is increasingly done in large-scale, centralized processing plants. Polarization has intensified both within communities (as some producers are more successful than others) and within regions and countries. Globalization is likely to accentuate this polarization between those included in the process and those excluded.

Stringent quality requirements

In addition to export quality control, an increasing proportion of the costs associated with maintaining quality (e.g. drying, grading, sorting, packaging) have had to be borne by the export trade. The development of the export market seems to have produced a two-tier quality assurance system. The demands of importing countries have required massive efforts to implement quality and food safety systems that meet these needs. The domestic markets are generally less stringent and investments in quality systems for these markets have been reduced or have stagnated. The identification of strategies and options to improve and maintain higher quality products to ensure marketability and the best available prices is an important issue resulting from liberalization.

Access to finance as a production constraint

Access to finance has become more important as high levels of investment are required to respond to international market demands including quality control. In developing economies, fish producers and processors, especially those operating on a small scale, face a perennial problem in gaining access to credit, due to the nature of their requirements, seasonality of the activity, high risks involved, and their lack of meaningful collateral acceptable to financial institutions. The lack of alternative employment and income opportunities for many small producers and processors further intensifies these problems. Fishers usually need a large loan before the start of the main fishing season to enable investments in fishing equipment, etc., and consumption credit to cover operation costs (i.e. crew salaries, maintenance, ice, fuel, etc.). Similarly for post-production, credit is needed to ease cash flow constraints, assist in the timing of sales and generally accelerate development. As mentioned earlier, the introduction and implementation of quality control systems to meet SPS require large investments. Banks and other credit lending institutions are often unwilling to provide loans to the small-scale fishing industry because of lack of collateral, high transaction costs, the relatively large amounts involved, high perceived risk and the highly seasonal nature of the fishing industry. It is not clear whether the provision of affordable credit to producers and processors is an issue of major importance to the maintenance of livelihoods, income generation and the future development of the fisheries sector in India. There have been studies to quantify the comparative profitability of mechanized and non-mechanized fishing units. Findings suggest that artisanal fishing units were relatively more efficient due to lower investment requirements (Sathiadas, 1997; Salagrama, 2001).

With greater price uncertainty, there is an increased reluctance to advance loans. With increased competition in the marketing chain and greater default risk, not only has the level of pre-finance to traders and producers often declined, but also foreign companies handle an increasing proportion of the market. The latter tend to have better access to finance as well as better market contacts and risk management techniques. This can make it difficult for local enterprises to compete.

Availability of physical and institutional infrastructure

In many countries Structural Adjustment Programmes of the World Bank/IMF have often led to deterioration in physical and institutional infrastructure as governments have reduced expenditure in an effort to balance budgets. Market reforms have led to a considerable emphasis on creating an enabling environment for private sector development – particularly in the export sector. In some cases the provision of some facilities (e.g. landing stages and cheap finance/grants to companies to improve their facilities) has assisted the fishing sector. However, continued poor physical infrastructure (e.g. rural roads, port, airport and telecommunication links, and cold store facilities) have increased production and marketing costs. This has been a serious impediment to seafood exports not only by reducing the availability of inputs and services but also by making it more difficult to market produce, including the satisfying of import requirements.

Summary of Selected Findings of the Project Globalization and Seafood Trade Legislation: The Effect on Poverty in India[9]

The research highlights the importance that the exports of seafood from India and from the three states studied in particular (i.e. Andhra Pradesh, Kerala and Orissa), play in earning foreign exchange and providing employment opportunities. The main products for export are shrimp and cephalopods from Kerala, mainly shrimp from Orissa and almost entirely shrimp from Andhra Pradesh. The states vary in their export destinations but the EU, Japan, USA and Asian countries are important. Because of the dominance of EU legislation in framing Indian export regulations, it seems that even though many exporters do not export to the EU, the way in which the EU develops food safety legislation will affect most of those in the export industry.

Andhra Pradesh

Since the early 1970s, there has been a rapid reorientation of fish production systems in Andhra Pradesh towards harvesting of exportable varieties. Andhra Pradesh has taken the lead in production of shrimp from brackish water aquaculture (for export markets) and carp from freshwater sources (for out of state markets such as West Bengal). Capture fishing has undergone changes to reflect the emphasis on exports: fishing systems that traditionally depended on a mix of different species have begun to concentrate on fewer varieties with good export values. New fishing gear such as trammel nets and long lines facilitated the process, while trawlers continued to capture shrimp by using nets with smaller mesh sizes.

While there have been efforts to diversify by changing fishing grounds into deeper waters through the introduction of deep-sea trawling, by targeting alternative species such as tuna, by using new fishing gear such as high-opening bottom trawls, these have largely remained unsuccessful, and shrimp has continued to be the focus of fishing and export operations.

Correspondingly, there has been a rapid growth in the infrastructure to facilitate exports of seafood. Freezing plants, ice plants and cold storages have been installed in areas that have production/processing/export facilities, rapid transport became possible as a result of good roads laid to connect most of the remote fishing villages, telecommunication systems facilitated efficient exchange of information between producers and buyers, and all these changes have had an impact on the way fish are caught, processed and traded.

The composition of exports from Visakhapatnam Port reflects the general 'low-volume-high-value' trend of the east coast. The volume and value of exports from Visakhapatnam Port have shown a consistently increasing trend throughout the 1990s. Japan is the most important importer of seafood from Visakhapatnam Port, its imports accounting for 75% by volume and 86% by value of the total exported from Visakhapatnam. The USA is the second largest importer of seafood from Visakhapatnam Port, followed by China, a number of South East Asian countries and the EU. Thus the impact of the EU ban on seafood exports from Visakhapatnam was only minimal.

With respect to shrimp, the cultured varieties have come to dominate exports constituting nearly two-thirds of the quantity and 75% of the value of the total shrimp exports from the state. There has been a corresponding decrease in exports of captured shrimp in real as well as percentage terms. There has been a steady increase in the quantity of finfish exports throughout the 1990s. There are indications that the finfish share of exports is continuing to increase in overall state exports.

[9] Based on Ashok *et al.* (2003).

Increased exports have meant the establishment of long chains of product flow and intricate networking between the various players involved in the activities both directly and indirectly. Alongside the change in the market channels for different seafood items, came a wide range of new players in the marketing systems. Commission agents, middlemen, carriers and transporters, truck operators, peelers and processors, packers and handlers, exporters and processing plant operators, ice makers and ice sellers, besides technicians, crate and basket makers, etc., have all found a place for themselves in the rapidly evolving export chains. One consequence of the existence of a large number of intermediaries is that the pricing mechanisms are influenced by them, often depriving the fishers of their rightful share.

There are no serious indications that increasing exports have taken away traditional livelihoods on a large scale. The increased emphasis on shrimp may have meant that many traditional fishing operations that were facing problems caused by poor catches of fish could manage to remain viable for a period.

Activities such as shrimp peeling by women, though practised are, however, confined to important port areas like Visakhapatnam, Kakinada, Machilipatnam and Nizampatnam, and where they have been closed over the last decade, it was for reasons other than changes in the seafood trade legislation.

The poor in the export sector mostly fall into the 'invisible poor' category, with little known about their roles, numbers and the impact of any changes on their livelihoods. Even the apparently well-off categories of poor are seen to fall into the category of 'potential poor' or 'tomorrow's poor'. Unfortunately, there is little quantitative or qualitative information on the various categories of people working in the export sector, particularly in relation to the impact of changing export trends, seasonality and shocks, such as a ban on exports, on their livelihoods. Most of them are not recognized as being direct stakeholders in the export sector, or even in the fishing sector in general and, being unorganized, current policy-making largely bypasses them. Consequently, their capacity to access institutional support remains weak. There are indications that their vulnerability is increasing as a result of changing seafood legislation (which emphasizes the need for more formalized systems of operation) and, more importantly, decreasing availability of shrimp from natural sources.

The changed seafood legislation in late 1990s did not have an apparent direct impact upon many people outside the processing and export categories, but there is evidence that there were long-term, indirect, trickle-down effects at all levels. Currently, the quality control systems do not extend beyond the processing plants, and the existing conditions at the landing, handling and pre-processing areas leave much to be desired. Similarly, the use of potentially harmful substances – such as antibiotics in the aquaculture sector – remain largely uncontrolled.

There are, however, indications that quality consciousness has been growing amongst different stakeholder groups. Use of ice, better handling, packing and transportation systems are instrumental in meeting the quality requirements of the processing plants.

The government's efforts to promote and sustain the export sector are felt to be appropriate in some areas, but inadequate in others. That the seafood industry is variously covered under the mandates of different central and state government ministries makes things difficult to implement. Most processing plants have upgraded their production and processing systems to meet international requirements. The government has extended support – technical expertise, technology and subsidies – to the processors in this respect.

It is possible that legislation will become more stringent and widespread in due course in which case the impact upon the various stakeholders

would be serious. Coupled with the problem of declining productivity in both the capture and culture systems, which is offset to a large extent by increases in the value of exports, the application of more stringent quality parameters would have serious consequences for the producer groups. It is possible that the production and processing systems would become more streamlined, and in the process, the seafood export industry could become more concentrated into fewer hands than before. The effect of such changes on the poor would be serious, because it is the informal nature of several of the systems, i.e. production, pre-processing, etc., that provides a livelihood for them.

It is suggested that a more people-friendly, people-empowering programme be adopted to ensure that the various stakeholders in the export commodity chain play a more productive role in improving the quality of the seafood exports without adversely affecting their own interests. In the short term, it is recommended that more emphasis be placed on raising awareness about quality amongst the different stakeholders, that efforts be made to make the seafood legislation less obscure and user-friendly and more uniformly implemented in different countries, and that options for diversifying the seafood exports from the state be explored, in terms of increasing the commodities exported, in order to overcome the constraints to which sole emphasis on shrimp could give rise.

Orissa

The study identified certain groups in the export supply chain as poor, i.e. traditional fishermen and their crew, crew in the mechanized sector, head loaders and other labourers in the chain, and unskilled workers in processing plants.

Although the contribution of the traditional fishing sector to overall volumes of exports appears small, the contribution of export species to individual household incomes of fishermen is far from insignificant. The most important export species for traditional fishermen are pomfret, seer fish and small shrimps followed by prawn. Overall, there is low involvement in the export supply chain by the traditional sector. The mechanized sector on the other hand depends almost exclusively on the export market of a single species – prawn; other species are treated as by-catch. Similarly, brackish water aquaculture depends on a monoculture of black tiger prawn, almost exclusively for the export market.

Labourers play a role in the processing of seafood for exports and hence are affected by changes in the industry, mainly in terms of wage rates and working conditions.

International quality regulations have forced the industry to undertake process improvements. This has definitely improved standards in processing plants, but not necessarily beyond. The quality assurance mechanism beyond the plants remains weak, especially at the landing centres and procurement points. This limits competitiveness of the industry as a whole in international markets, with possible effects on the poor downstream, although the last is not clearly established. The response of the government in regulating the seafood export industry has been reactive rather than proactive.

Improvement of facilities for on-board handling and at the landing centres is clearly important. Improved information flow (on demand, supply and prevailing prices) to the stakeholders, especially those at the bottom end of the supply chain, would increase their bargaining power vis-à-vis the traders and dealers. Lack of availability and accessibility to formal sources of credit is another impediment resulting in increased dependence of poor fishermen on middlemen and traders.

Present levels of enforcement of regulations do not seem to have had any visible or discernible adverse impact on livelihoods of the poor involved in the export supply chain. This study seems to indicate that livelihoods of poor people in the chain are currently only marginally

affected by international legislation, mostly in a negative way. These effects are, however, likely to be accentuated if EU type legislation becomes more stringent or enforced more stringently. In particular, stricter regulations and enforcement, especially with regard to traceability, could have significant impact on the poor.

Kerala

Kerala is one of the major maritime states in India accounting for 20.5% of the total marine fish landings in India in 1999–2000. The major species landed are oil sardine (14% by volume) and shrimp (13% by volume). Kerala is also one of the prominent exporters of seafood from India. During 2000–01, Kerala accounted for 20.6% in volume terms and 16.0% in value terms of Indian seafood exports. The major export species from Kerala are shrimp (59% by value, 32% by volume), frozen cuttlefish (15% by value, 16% by value) and frozen squid (13% by value, 17% by volume). Finfishes, which account for 28% by volume, are a relatively low value item accounting for just 9% of the total export value.

The EU is the main destination for seafood exported from Kerala with 33% of the volume (and 36% of value) during the year 2000–01 going to this market. Japan (11% by volume and 18% by value) and the US (15% by volume and 22% by value) are the other major markets. South East Asia (mainly China), which accounts for 34% by volume, accounts for only 16% by value, indicating that this market mainly buys lower value species, such as frozen ribbon fish and frozen mackerel from Kerala.

Kerala was one of the states worst affected by the EU ban imposed on shrimp imports from India in 1997. This was mainly because most of the processing plants in Kerala were catering exclusively to EU markets. Within a short span of 4 months, six processing plants in Kerala upgraded their plants to meet EU standards and obtained licenses to export to the EU. At the time of the ban, there was a sharp fall in beach prices of export species such as shrimp, cuttlefish and squid. After the ban was lifted on the six units that complied with EU norms, the beach prices did not rise much because there were large numbers of sellers and few buyers. This ensured that the prices remained lower than the pre-ban period. The early movers procured raw material at very cheap rates and tapped into the EU market. The other processing plants followed suit and invested heavily in upgrading their plants. Over the next 2 years, several plants obtained EU approval and re-entered the EU market. This resulted in increased competition for raw material, which drove up beach level prices. In 2002, beach prices were higher than the pre-ban price mainly because of the increased competition and scarcity of raw material.

The EU ban had both a short-term direct impact and a long-term indirect impact on the peeling shed industry. The short-term impact was such that overnight most of the processing plants, the sole customers of the peeling sheds, stopped purchases. Thus many peeling sheds found themselves without many of their traditional customers. The numbers of buyers fell sharply and competition among the peeling sheds for the limited market intensified, with those able to provide material on liberal credit arrangements preferred. Thus the smaller sheds, which were unable to provide material on credit, were gradually pushed out of the industry. This led to a consolidation of sorts in the industry. There has been a decline in the number of peeling sheds in the aftermath of the EU ban. In place of the large number of individual small-scale peeling sheds, there are now larger peeling sheds and peeling shed networks. Most of the small-scale peeling sheds that currently operate work as sub-contractors to the larger peeling sheds. The larger peeling sheds have been able to survive mainly on account of enlarging their raw material procurement base and the ability to provide peeled material on credit to processing plants.

The implementation of EU legislation regarding pre-processing and processing of seafood has been varied at different levels of the industry.

Since the number of processing plants are few and they are required to be registered, the governmental bodies in charge of implementing legislation have a greater level of control over them. Processors complain that government officials have been too stringent in their interpretations of the EU directives and this has resulted in higher costs for upgrading plants. However, a key aspect of the EU directives is that pre-processing activity should be carried out on the same premises as the processing. The degree to which this aspect of the directive has been enforced is questionable. Many of the processing plants which supply the EU market continue to procure peeled material from independent peeling sheds in direct violation of this requirement of the directive. This is mainly because given the uncertain supply of raw material and the dispersed nature of raw material availability, it is advantageous for processing plants to rely on the peeling shed industry to aggregate raw material and supply it to them. This reduces the cost of procurement and the risks attached (mainly the risk of spoilage) for the processing plants. EU-approved processing plants have pre-processing facilities attached to them, but in most cases, these facilities are mere showpieces during plant inspections by the relevant authorities.

The fact that the peeling shed industry is still operational is itself testimony to the degree of implementation of EU directives. Not only are they functional (which they should not be if EU directives are strictly enforced), there are few peeling sheds that conform to the process and infrastructure requirements as laid down in the EU guidelines.

One of the main complaints that processors/exporters have about the EU legislation is that it is more in the nature of a non-tariff trade barrier than an effort to ensure food safety. Many processors are of the opinion that the quality and process standards with which they are required to comply are expensive to implement and in addition, processing plants in Europe are not required to maintain the same high standards. This in turn negatively impacts on the cost competitiveness of Indian exporters vis-à-vis their EU counterparts. The widely held view in the Kerala industry is that the EU directives are mainly to protect the local industry from cheaper imports.

One of the long-term effects of the EU ban is the emergence of a small group of powerful players in the processing industry. It is estimated that in 1999–2000, 8 out of the approximately 80 seafood processors in Kerala handled around 80% by volume and value of the total seafood processed in the state. There are concerns that this same group could exercise greater control over the supply chain in the years to come, manipulate prices and thus hurt the other players in the industry.

The implementation of the EU legislation has at best been patchy. That explains to a large extent the lack of any significant impact on the livelihoods of people who depend on this industry. However, the situation could be very different if implementation is carried through thoroughly. The first casualty of a thorough implementation could be the peeling shed industry, as EU legislation requires all pre-processing activities to be carried out in approved pre-processing facilities attached to the main processing plant. If the farm to fork principle, which requires traceability, is carried out, it could have cost implications for all players in the supply chain. It remains to be seen how the various players will cope with any such strict implementation of international seafood legislation.

Main Findings of the Project Fish Distribution from Coastal Communities in Bangladesh – Credit and Market Access Issues

Access to sea and river fishery resources is the traditional livelihoods asset of households in a coastal fishing community in Bangladesh. This is complemented by gear such as boats and nets. Other assets include land and means of agricultural production, transport, health, education and financial resources in the form of savings, cash or credit.

Different wealth categories exist within the fishing villages. According to the villagers' own judgement, the proportion of the poor (i.e. moderate poor to very poor) within the fishing communities is about 50–70% in the communities where the research took place. It has been observed that the number of households belonging to the hardcore poor is relatively less in villages which have direct access to the open sea. This may be related to the development of nearby tourist spots (i.e. Cox's Bazaar and Kuakata Beach, respectively), which offer alternative income opportunities. In addition, the availability of shrimp seeds and other less valued species in the adjacent Bay of Bengal provide poor people with comparatively better livelihood opportunities than other places. At the same time, it needs to be borne in mind that there is often little difference in the living standards between the so-called middle classes in the villages and the poor.

Landless households, widows or divorced women, households with either no children or large numbers of children (i.e. especially girls, who will require dowry to get married), and families without regular income represent the most vulnerable households.

Factors that cause poverty in the communities include declining fish catches, lack of security (mainly in the fishing grounds due to piracy), natural disasters such as cyclones or floods, lack of capital, lack of employment opportunities, and lack of health and education/skills.

Both fishermen and traders state declining fish supplies and piracy in the sea and on the rivers as their main problems. Some stakeholders, such as *aratdars*, predict that only deep-sea fishing will survive in the long-run. Also, more concentration is likely to occur within fishing communities (i.e. fewer people will own bigger boats).

Where catches will decline beyond a certain level, it may well lead to uncompetitive situations to the extent that traders and moneylenders will leave affected locations. This will most likely result in a less efficient marketing system in that trading competition will decrease.

In addition to the demand for seafood products in overseas markets, certain marine fish species (e.g. *hilsha,* jewfish) are exported to India, Hong Kong and other countries. This appears to put upward pressure on domestic prices.

The decline in supplies of domestic marine fish is at least partly compensated for by increased production of freshwater fish (i.e. mostly from aquaculture), and imports of fresh and dried fish from Myanmar and India.

Although there is scope for improvement, marketing is less of a constraint according to the stakeholders consulted. Areas which can potentially be targeted for marketing-related improvements include more emphasis on marketing training at community level, improvements of market infrastructure (i.e. often only small improvements are required), better post-harvest handling practices (including reduction of chemical use in dried fish processing), and better exploitation of export opportunities.

Overall, the marine fish marketing system is quite efficient in that physical and qualitative losses are small. The marketing margins appear reasonable given the highly perishable nature of

the product, particularly in the case of fresh marine fish marketing. The dried fish distribution system is also efficient, however, fishermen supplying the processing industry receive low prices for their fish when there is a glut in the main season, especially in the more remote areas.

If fishermen are 'exploited' in their loan arrangements with traders, this reflects inefficiencies of the credit system (the opportunity cost of capital is very high in Bangladesh, i.e. 5–15% interest per month). Nevertheless, there are variations in the informal credit system and changes are taking place. The credit conditions are more favourable in certain locations compared to others. In particular, lower informal interest rates have been observed where NGOs are active with micro-finance programmes.

The production and marketing of dried fish will see changes. Although dried fish processing and trading will still provide employment for large numbers of people in the foreseeable future, in the long term, it is expected that less fish will be processed, even in remote areas, as a result of:

- declining fish catches
- increased demand for fresh fish (due to increases in population and purchasing power)
- better transport links
- ice supply, and other means of preservation.

At the same time, some fish, such as ribbon fish, will continue to be consumed mainly in dried form. Also, there is a demand for good quality dried fish for export, which according to traders is currently not being met.

Some of the traders will be squeezed out; for example, there will be more concentration at wholesaler level. The contradiction between market efficiency and equity will remain at the retailer level. On the one hand, many retailers and vendors including women (about 10–20% of retail traders are female) depend on fish marketing for their livelihoods, on the other hand, this considerably adds to the marketing margin. Ultimately, it will be the consumers who will have to bear this cost.

Due to declining fish supplies, parts of coastal fishing communities will be forced out of the fishery to seek other employment. As a consequence, alternative income-generating activities need to be urgently identified and created.

Results of wealth ranking exercises in the Bangladesh study

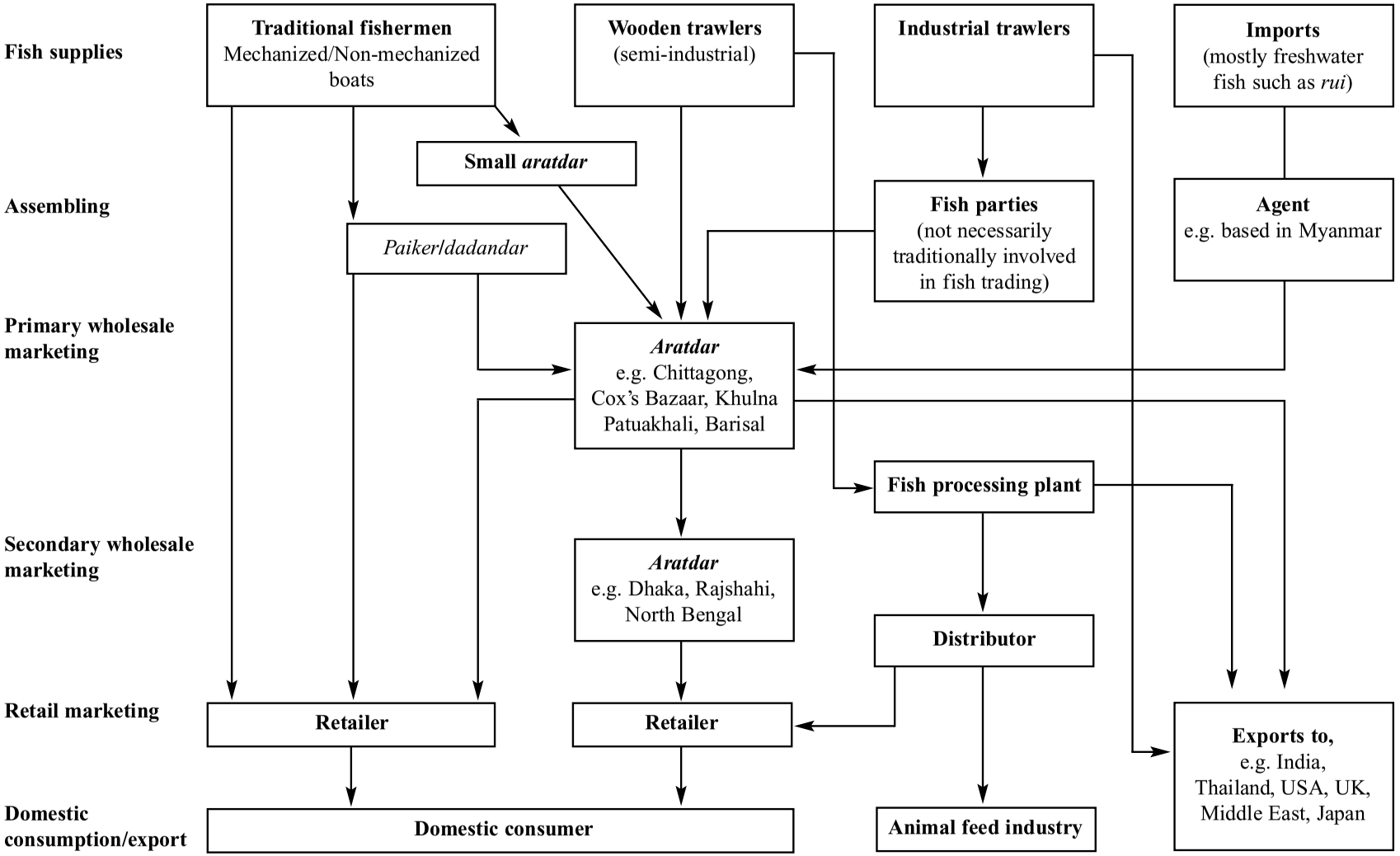
Wealth ranking exercises were carried out in all of the six fishing communities as part of the participatory rural appraisals. Depending on the villages, 3–5 wealth categories were identified.

Ownership of assets, such as land, fishing boats and nets, house (and its condition), financial resources and animals, have been identified by the villagers as key criteria for wealth. In addition, access to education and health services, as well as social influence and types of job or business were mentioned.

Table A1: Summary of wealth ranking exercises

	Latifpur	**Hatkhola-para**	**Kuakata Panjupara**	**Lebukhali**	**Debraj**	**Kulla**
Wealth categories according to villagers, and number of households per category	Big (*Bara*)/rich: 12 Middle (*Majhari*): 40 Small (*Choto*)/poor: 49 Total number of households: 101	Rich: 3 Moderately rich: 17 Middle class: 19 Moderate poor: 62 Poor: 9 Total number of households: 110	Rich (*Dhani*): 8 Middle class (*Majari*): 50 Moderate poor (*Motamuti sachaal*): 92 Poor: 44 Total number of households: 194	Rich (*Sachaal*): 23 Middle class (*Samannya garib*): 7 Middle poor (*Modhya garib*): 11 Poor: 11 Very poor: 22 Total number of households: 74	Rich (*Mohajan*): 6 Middle class (*Madhyam gerostha*): 13 Well off (*Sachaal*): 41 Poor: 49 Very poor: 61 Total number of households: 170	Rich (*Sachaal*): 13 Middle class (*Majari*): 17 Poor: 55 Total number of households: 85
Proportion of moderate poor to very poor	49%	65%	70%	59%	65%	65%

Source: Kleih *et al.* (2003).



Source: Kleih *et al.* (2002).

NB: *Aratadars* are wholesale traders and/or commission agents.
Paikers are intermediary traders.
Dadandars traditionally act as moneylenders cum traders.

Figure A2: Commodity chain of fresh marine fish, Bangladesh

Table A2: Seasonality in the fishing community of Hatkholapara, Cox's Bazaar District, Bangladesh

Months	Baishakh Apr–May	Jaistha May–Jun	Ashar Jun–Jul	Srabon Jul–Aug	Bhadra Aug–Sep	Ashin Sep–Oct	Kartik Oct–Nov	Agrahaian Nov–Dec	Poush Dec–Jan	Magh Jan–Feb	Falgun Feb–Mar	Chaitra Mar–Apr
Gill net fishing *Hilsha*	•••	••			••••••••••••	••••••••••••	••••••••••••	••••••	••••••	•••••	••••	••••
SBN fishing Chiri, Phaisha, Popa, Bombay duck, Kamila, Pompret, Cat fish, shrimps, other small species	••••••	••••	••••	••••	••••••••	••••••••••••	••••••••	••••••••••••	••••••••	••••••••	••••••••	••••••••
Long line fishing Red popa, Mud, Kala, Popa, Keri, Popa, Sundari, Nakra, Aus	•••••	••••	• •	••••	•••••••••	••••••••••••	••••••••••••	••••••••••••	•••••••••	••••••••	••••••	••••••
Current net fishing Jhatka, Phaisha, Pata, Bombay duck, Tailla, Alua, Batasha	••••••••	••••••••	••••	•••••	•••	••	••	••••••••••••	••••••••••••	••••••••••••	••••••••••••	••••••••••••
Phailla net fishing Rupchanda, Kalachanda, Big *hilsha*, Tailla									••••••••••••	••••••••••••	••••••••	
Mashari net fishing (shrimp fry)	••••••••••••	••••••••••••	••••••••••••	••••••••••••	••••••••	••••••••	••••	••••				
Paddy cultivation	••••••••••••	••••••	••••	••••••••••••			••••	••••••••••••		••••••••••••		
Net making (women)	••••	••••••	••••••	••••••••••••	••••••	••••	••••	••••	••••	••••	••••	••••
Wage labour (Fishing)	••••••••••••	••••	••••	••••	••••••••••••	••••••••••••	••••••••••••	•••••••••	•••••••••	•••••••••	••••••••••••	••••••••••••
Wage labour (paddy fields)	••••••••••••			••••••••••••	••••	••••	••	••••••	••••	••••••••••••	•••	
Income (boat owner and crew)	••••••	••••	••••	••••	••••••••••••	••••••••••••	••••••••••••	••••••••••••	••••••••	••••••	••••••	••••••
Marriage	••••••••••••	••••••••••••				••••		••••	••••			••••••••••••
Need for cash and credit	••••••••		••••••••	••••••••••••	••••••••		••••••••					
Financial crisis (wage labourers)	••••	••••••••••••	••••••••••••	••••••••••••						••••••		

Source: PRA exercises by CODEC and NRI in Kleih *et al.* (2003).

Table A3: Calculation of marketing margins: marketing of *Hilsha* from a landing centre near Chittagong to Dhaka markets, July 2001

Selling prices and marketing costs	Taka/kg	%
Assembling		
Selling price: Fisherman to *paiker* at landing centre	60.00	50%
Transport to assembly/wholesale market (by small boat or rickshaw)	1.50	
Ice	1.00	
Labour	2.50	
Packaging	0.25	
Commission (5% of sales; this goes to *aratdar*)	4.00	
Net income for Chittagong *paiker*	10.75	
Wholesale marketing		
Selling price: Chittagong *paiker* to Dhaka *aratdar*	80.00	67%
Transport from Chittagong to Dhaka by truck	1.50	
Ice	1.50	
Packaging and handling	1.30	
Miscellaneous	0.50	
Opportunity cost of capital (5% of wk capital)	4.24	
Net income for Dhaka *aratdar*	5.96	
Retailing		
Selling price: Dhaka wholesaler to retailer	95.00	79%
Retail marketing costs	13.00	
Net income to Dhaka retailer	12.00	
Selling price: Dhaka retailer to consumer	120.00	100%

Source: Kleih *et al.* (2003).

Assumptions:
- no *dadan* (i.e. informal loan) involved between fisherman and *paiker* (intermediary trader)
- part of commission paid by *paiker* to *aratdar* (wholesale trader/commission agent) represents interest on loan
- transport is by truck
- prices are for small to medium sized fish (300–600 g)

Table A4: Positive and negative aspects of *dadan in fish marketing**

Pros	Cons
● The fish catching and marketing system would not be as efficient as it is without the substantial amounts of credit injected by *aratdars*. Certain developments and innovations would probably not have taken place, or only at a much slower pace, without their financial involvement. ● Given that 'firm' business relationships are established, transaction costs such as searching for trustworthy business partners and contract enforcement appear to be comparatively low. The resulting interlocked transactions enhance the speed at which a commodity moves through its marketing channels. ● Long established *dadan* relationships between traders tend to be built on trust, which again reduces transaction costs. ● *Aratdars* have funded an industry which was largely neglected by formal banks and NGOs. This has provided large numbers of people in coastal areas with access to credit, which they would not have had otherwise. This has created employment and improved food security at micro- and macro-levels. Indirectly, the poor are likely to have also benefited due to the spin-off effects created.	● There is scope for exploitation due to the mostly informal nature of the credit arrangements. In particular, fisherfolk depending on intermediary traders cum moneylenders (i.e. *dadandars*) are often exposed to dubious business practices, the rules of which can vary from location to location. ● Minority groups appear to find it more difficult to stand their ground when dealing with business partners in the majority. This may include Buddhist dried fish traders who have provided advances to suppliers, or Hindu fishermen having to pay a higher interest rate on their *dadan* (i.e. through substantial reduction of selling price below market rate). ● The informal credit system has the tendency to create dependency relationships resulting in increased indebtedness over time. ● Due to the informal nature of the system, lenders may sometimes use violent measures to pursue their interest.

Source: Kleih *et al.* (2003).

NB: *Dadan refers to a type of informal loan in Bangladesh as part of interlocked credit/marketing transactions whereby, traditionally, the loanee has to sell to/through the loan provider at a discounted price.

Examples of findings from questionnaire surveys in Bangladesh

Table A5: Access to institutional and non-institutional loans by villagers

Sources	Number of sample respondents	Frequency (%)
Non-institutional	205	68.4
Institutional	68	22.6
No loan obtained	27	9
Total	300	100

Source: Solaiman (2002).

Table A6: Storage systems used by traders

Storage system	Number of sample respondents	Frequency (%)
Cold storage	4	1.33
Traditional system by using ice	284	94.67
Private preservation store with ice	4	1.33
Cold storage and private preservation	8	2.67
Total	300	100.00

Source: Nurul Kareem (2002).

Table A7: Benefits associated with NGOs

Benefits	Number of sample respondents	Frequency (%)
Get loan	151	48.7
Education	24	7.7
Get loan and education	39	12.6
Remove poverty	3	1.0
Beneficial for development	16	5.2
Helping people	10	3.2
No response	25	8.1
NA	42	13.5
Total	310	100.00

Source: Chowdhury (2002).

Appendix 5

Examples of Checklists and Guidelines Developed for Fieldwork in Bangladesh and India

Schedule of Activities Carried Out per Village During the Course of the Participatory Rural Appraisal/Rapid Market Appraisal in Bangladesh

Day 1

	Team 1	Team 2	Time	Location
Session 1	Introductory meeting with village heads and community leaders		1–2 hours	Village
Session 2	Discussion with key informants about the general background of the community	Mapping exercise of the village with key informants Participatory observations of landing site, fish processing areas, etc., with key informants	2 hours	Village
Session 3	Making arrangements for group discussions on day 2 (commodity chain) and wealth ranking (key informants)		0.5–1 hour	Village
Session 4	Review of existing secondary sources of information about the community			Accommodation team
Session 5	Daily recap with all team members		1 hour	Accommodation team

Day 2

	Team 1	Team 2	Time	Location
Session 1	Commodity chain with a mixed group of fishers and traders		2 hours	Village
Session 2	Key informants interview with women for general information about the community	Wealth ranking exercise with key informants	2 hours	Village
Session 3	Recap of sessions 1 and 2 to identify main players Preliminary selection of participants for activities on days 3–5 based on wealth ranking exercise and make arrangements with village contact persons		1 hour	Village
Session 4	Daily recap with all team members		1 hour	Accommodation team

Day 3

	Team 1	Team 2	Time	Location
Session 1	Seasonal calendar with a group of men	Ranking exercise	2 hours	Village
Session 2	Focus group discussion on commodity chain with separate key player groups (i.e. fishers)	Focus group discussion on commodity chain with separate key player groups (i.e. fish processors)	2 hours	Village
Session 3	Making arrangements for day 4 (focus group discussions with defined groups of key players)		0.5–1 hour	Village
Session 4	Daily recap with all team members		1–2 hours	Accommodation team

Day 4

	Team 1	Team 2	Time	Location
Session 1	Participatory poverty assessment with men	Participatory poverty assessment with women	2 hours	Village
Session 2	Focus group discussion on commodity chain with separate key player groups (i.e.*paikers*)	Focus group discussion on commodity chain with separate key player groups (i.e. hawkers – *beparies*)	2 hours	Village
Session 3	Feedback to village heads and farewell		1 hour	Village
Session 4	Daily recap with all team members		1–2 hours	Accommodation team

Day 5

	Team 1	Team 2	Time	Location
Session 1	Focus group discussion on commodity chain with *paikers/aratdars* at a nearby main fish market		2 hours	Main fish market
Session 2	Market interviews with individual fish traders (fresh)	Market interviews with individual fish traders (dry)	2 hours	Main fish market
Session 3	Daily recap with all team members		1–2 hours	Accommodation team

Day 6

Team 1	Team 2	Time	Location
Additional field day if required			

Checklist for Participatory Poverty Assessments (Focus Group Discussions)

Objective

Discussions to be held with groups of men and women separately. The focus of the discussion is about the changes occurring within the fishing communities and how these relate to poverty. Note changes in access to social, physical, natural, human and financial capital and both positive and negative consequences.

Poverty

- What are the visible signs of poverty?

  How can you see someone is poor?
- What makes people poor?

  What are the circumstances in which people fall into poverty. Ask first in general terms. Then probe to see if they can think of a specific example of someone in their community who used to be well-off and has become poor.
- What are the ways of getting out of poverty?

  If the group has come up with rather general issues such as improved access to education and skill training, creation of job opportunities, ask if they can think of specific people within their community who have managed to move out of poverty and *how* they managed it.
- What makes it difficult for poor people to improve their well-being/to move out of poverty?
- Are some groups more vulnerable than others?

  If the group finds it difficult to think in general terms (i.e. ill people, old age or widows), ask if they can think of anyone within their community who they believe is more vulnerable than them and ask the reasons why.
- If poor people experience hardship due to changes in living conditions or shocks, how do they *cope* with it?

  Again if people find it difficult to answer generally ask for examples within their communities and/or nearby communities.

Physical

- Has the number of nets and/or boats increased or decreased within the community?
- Has it become easier or more difficult for poor people to access fishing nets and/or boats/engines? Why?
- Has the provision of transport improved? Do people feel it is sufficient?
- How is the access to markets, are both traders and consumers' needs catered for?

Social

- Have there been changes in the way extended families support each other in times of difficulties? If yes, how has it changed?
- Do they feel that rich community members respect and/or try to help the poor?
- Do they feel that the *thana* union is supporting or tries to help the poor? If no, why not? And the government?
- Has the number of people migrating from the village increased/decreased over the past years?
- What are the main reasons why people migrate? Where do they migrate to?
- If increased migration, does it have a positive or negative impact on the community/ families? How?

Human

- Has access to health services changed over the past 20 years? If yes, how, has it become better/worse for the poor?
- Have there been changes in access to education and skills training opportunities? If yes, how? Has it become better/worse for the poor?

Financial

- In case of unexpected cash requirements, what are the most important sources of capital?
- If people want to start a new activity, how do they get the start-up capital?
- What are the most important sources of credit (probe for informal, NGO and bank services)?
- Are there people who have limited or no access at all to these sources of credit? If yes, who and why not?
- Compared to the past, has access to credit improved, decreased or remained the same? If yes, explain?

Natural

- Have there been changes in the environment/natural resources such as fish stocks, weather, water supply, air, forests and land?
- What has changed?
- Who has been affected in particular?

Livelihood strategies

- What are the occupations/main sources of income of the *poor* men of the community?
- What are the main sources of income of the *poor* women of the community?
- What types of occupations would the group members prefer to have?
- List the preferred occupations and rank them and explore the reasons for the ranking.
- Compared to other sources of income, has the importance of fishing-based occupations changed (increased, decreased or remained the same)? Reasons?

Checklist for Mapping Commodity Chains

Objective

To develop an understanding of the commodity chain, the produce, the key players, opportunities and challenges. This exercise can be done both in the village and the fishing terminal.

Material needed

Large sheets of paper, markers, pens and tape.

What to do

Have a mixed group of traders, fishers and processors. Make sure that the exercise is not dominated by one individual.

Explain purpose of exercise. We would like to learn from them:

- Who is involved in the marketing of fish?
- Where and how the fish is sold?
- What the constraints are and perceived solutions?

Start with identifying how many different marketing channels there are, i.e. related to fish technology and/or fish species. For example, there may be a different commodity chain for *hilsa* and Bombay duck. After identification of the main commodity chains, discuss and map each one separately, by going through the following steps.

Identify the players in the commodity chain at village and trader level, and write them on the paper or use symbols suggested by participants (especially if some of them are illiterate). Ask the following questions:

- Who is involved in fish catching and processing in the village?
- Who buys the fresh/processed fish?
- Where does the fresh/processed fish go to then, for as many stages in the marketing chain of which the participants are aware?
- The number of traders per category? How many are community members and/or outsiders?
- The scale of their business and whether they provide credit or take credit (to whom/from whom)?
- Extent of competition between the traders?
- Draw arrows representing commodity flow between players, use *thicker* arrows for more important volumes.

Additional questions

- How is the fish transported, to where, and is ice used?
- 'How' fish is sold, i.e. pricing mechanisms?
- Flow of information in the commodity chain, for example, are fishers and/or villagers aware of prices in the main fish markets (i.e. the regional or national markets, i.e. Dhaka, Chittagong, Cox's Bazaar and Khulna)?
- Are there barriers of entry into the market at community level (e.g. can fisherfolk sell their fish directly at the local market, or in Chittagong/Cox's Bazaar?
- The relationship between selling of fish and credit. How many traders and moneylenders provide credit, i.e. the proportion of people who provide/take credit? Why? What are the practices involved (e.g. conditions and terms)?
- Changes and dynamics in the system over the last three decades?
- Physical and qualitative losses in the chain?
- Means of preservation used for fresh and processed fish (e.g. what chemicals)?
- Main problems in the marketing system?

Suggestions by the participants?

Checklist for Focus Group Discussion with Fishermen

Objective

To obtain better understanding of the activities, opportunities, challenges and changes they have experienced. It also seeks to explore the relationship they have with other key players from their perspective.

Points to discuss

Remember this should be a discussion, so do not follow rigidly the outline.

First ask the participants to introduce themselves and talk about the type and number of boats and nets they have. How did they acquire these? Have there been any changes in the number/type of boats they have?

- How is the fishing organized? For each specific fishing technology ask:
  - number of crew required
  - salary arrangements and/or sharing arrangements for the catch
  - length of working agreement (seasonal/day to day), continuity of crew composition?
  - do boat owners assist the fishing crew in any other way (i.e. food, part of the catch, loans, support for family in times of emergencies, etc.)
  - have there been any changes in the way fishing is organized?

- Constraints faced regarding fish catching? List constraints according to priority?
- How much fish is sold, and how much is consumed by the family?
- In what form is fish sold, i.e. fresh or processed?
- If fish is processed, what techniques are used (e.g. sundrying, salting)?
- Who is in charge of processing in the village? (If it turns out that some of the fishermen also process, use separate checklist for processors.)

The following questions are for fresh fish only.

- Constraints faced regarding marketing of fresh fish. List constraints according to priority?
- How much time passes between catching the fish and landing, how many stages are involved? What preservation techniques are used?
- How much time passes at the landing site before fish is sold?
- Are they able to sell all the fish they catch? Do they ever have to discard fish or throw it away? If so, why?
- Is ice used at all. If yes, by whom? Is ice easily available if needed? What type of ice is available – block, flake or plate? How much does it cost, and where does it come from?
- How is fish transported from the landing site to the market? Vehicles used? Means of preservation? Costs involved?
- Is fish sold according to different grades and if so what criteria are used? And how does the price vary according to the different grades?
- Range of prices obtained for main fish species during main season and off-season?
- What sort of quantities of fish are downgraded on average, per season?
- How is fish marketing organized in the village? Who are the buyers?
- How much of the fish enters which marketing channel? And where do these channels lead to?
- Are they aware of fish prices in major markets of the country? If yes, source of information and what are the prices at the moment? If not, do they think it would help them if they knew the prices, and how would it help them?
- Is it possible for individual fishermen to sell fish in Chittagong market or other markets? If yes, how many are doing it, and who? If no, why are they not doing it?

- What is the link between credit and marketing? How does it affect the price? (It is important to obtain objective answers in this context!)
- If they have obtained loans and are now obliged to sell fish to the moneylender/trader, why did they enter this relationship? What are the conditions?
- For what do they need credit? Ask them to prioritize.
- What are the possibilities for obtaining credit from semi-formal or formal sources of credit (i.e. NGOs, banks)? What are the conditions?
- Is there a fishermen association/co-operative in the village? If yes, what are its functions, and how many members does it have? Who are the members?
- Have they ever thought about creating an association and selling the fish as a group in the Chittagong market? What are the potential difficulties/costs associated with this?
- Do they have any other issues they would like to discuss?
- What suggestions do they have to solve the problems discussed during the course of the meeting, related to fish catching, marketing, and credit?

Thank the group for time and information!

Checklist for Interviews with Traders

Objective

To obtain a better understanding of the activities, opportunities, challenges and changes, traders experience(d) with the trade in export species (shrimp, squid, cuttlefish and lobster), with a particular focus on post-harvest issues and international quality and hygiene requirements.

Tools

Focus group discussions or individual interviews as it may prove difficult to organize focus group discussions with traders. Pay attention to different types of traders involved in the export trade (scale and nature of operation, i.e. small traders versus large independent traders and local agents linked to processing plants/export house, gender).

Introduction

- Introduce the team, explain research activities and purpose of interview.
- Ask people to introduce themselves – name, type of trader and for how long they have been trading export species.

Trading as a livelihood

- What species of domestic and export fish do you trade?
- Are there any seasonal changes in the type of species in which you trade?
- For what species do you get the highest and lowest margins?
- Which is the most important species for your income, in terms of value and volume?
- Do you and your family members have any other fisheries-related sources of income?
- Do you and your family members have any non-fisheries-related sources of income?
- Which source is the most important for supporting your family?

Marketing

- Where and from whom do you buy your fish (e.g. small fishermen, trawlers)?
- Which is the most important source of supply?
- Do you provide seasonal advances to fishermen?
- Who do you sell to? Map the commodity chain (export house/peeling shed/processing plant, wholesaler).
- What are your main marketing and operation costs (i.e. transport, storage, handling, ice, finance)?
- Have particular types of costs increased over the past years?
- If yes, which ones and why?

If (s)he supplies peeling sheds

- How many peeling sheds do you provide with fish?
- Do you also run your own peeling sheds or are you employed by peeling sheds?
- Is the number of peeling sheds rising, falling or amalgamating?
- Are processing plants and/or export houses investing in peeling sheds?
- Have you observed any changes in the structure and organization of peeling sheds?

Price setting

- How do you decide at which price to buy?
- What are your sources of price information?
- Does the quality of supply affect the price you offer?
- If the quality is not 100%, do you still buy or opt out?

Post-harvest and quality requirements

- Do you do anything to the product before selling? If yes, what (e.g. ice, packaging)?
- How do you store and package your supply before and during transport?

- How are your goods transported?
- Have there been any changes in the way the export species are handled, stored, packaged and transported (i.e. mode of transport, use of crates/baskets, use of ice, time between landing, auction and further)?
- Are you satisfied with current landing site and transport facilities? If not, why not?
- How do you ensure the quality of your purchased supply before you sell it on?
- What is the basic minimum quality you expect from fishermen?
- What is the basic minimum quality required by the export house, processing plants or peeling sheds?
- Have there been any changes in quality requirements from processing plants, peeling sheds and export houses?
- If yes, in what way and why?
- Do you find it difficult to meet these quality requirements? If yes, why? Do you feel these requirements are unrealistic?
- Do you get advice/extension about quality issues and marketing? If yes, by whom and what type of advice? (Example)
- Do you feel the level of advice/extension is sufficient?
- Was there any crisis in the industry about 5 years back? If yes, what was the reason and how did it affect you and the other players in the industry? If no, have you heard of the EU ban in 1997? How did it affect you?
- Are you aware of Indian legislation regarding quality and food safety? If yes, what does it stipulate?
- What do you know about international legislation? Are there any differences in quality requirements from Japan, USA and Europe? If yes, in what way and how does it affect your business?
- Have there been any changes in their requirements? If yes, in what way and how has it affected your business?

Problems and perceptions

- Has the number of traders in your area changed, increased, decreased or remained the same? If increased, how and how does it affect your business? If decreased, how and did it affect your business?
- Are you planning to expand your business? If not, why not?
- What are the problems you face in your business? Which is the most important?
- Have there been any major external events that affected your business in a negative way (i.e. EU ban of fish exports from India, decline in catches)?

Checklist for Interviews with Peeling Shed Owners

Objective

To obtain a better understanding of the activities, opportunities, challenges and changes, peeling sheds owners experience(d) in the trade of export species (shrimp, squid, cuttlefish and lobster), with a particular focus on post-harvest issues, pre-processing activities and international quality and hygiene requirements.

Tools

Focus group discussions or individual interviews as it may prove difficult to organize focus group discussions with peeling shed owners. Pay attention to different types of peeling sheds involved in the export trade (scale and nature of operation, and species pre-processed, individually owned or corporate owned).

Introduction

Introduce the team, explain the research activities and purpose of interview.

Ask people to introduce themselves – name, and for how long they have been involved in the peeling shed business.

Operation

- What species, both export and domestic, do you handle?
- Which species is most important to your income in terms of volume/value?
- What type of peeling activities do you carry out?
- How do you decide which pre-processing activities are required?
- Have there been any changes in the type of peeling activities carried out in your peeling shed? If yes, in what way and how has it affected your business?
- What are your sources of supply (purchased, delivered by local traders, local agents on behalf of processing plants/export houses)? Rank according to importance (value and volume).
- Have there been any changes in your main sources of supply over the past 10 years?
- Do you mainly provide services to local agents/processing plants or do you buy and sell, or mix?
- If you sell, who do you sell to – number and structure of export trade and their role in the trade?
- What is the maximum daily capacity? Is it flexible?
- Is your peeling shed used by other peeling sheds in case of insufficient capacity?
- Do you use other peeling sheds in case of insufficient capacity?
- What is the annual volume you handled last year?
- Did it change from the previous 5–10 years?
- In the past 5–10 years, which was the best/worst year, and why?
- If you want to start a peeling shed, what type of infrastructure and services do you need?
- Do you see any deficiency, which hampers your pre-processing activities? If yes, what?
- What are your main operation costs (breakdown of items but not the costs, i.e. labour, infrastructure, running costs)?
- Which is your main operation cost?
- Do you expect any changes in operation costs for the near future? If yes, in what way and why?
- What are your sources of finance for establishing/running peeling sheds?
- Do you take advances from processing plants?

Labour

- How do you recruit your labour force?
- Do your family members also contribute to labour in your peeling sheds?
- Can anyone become a peeler?
- How are they paid?
- Are they employed throughout the season?

- Do they work shifts? Working hours?
- Do you experience problems in ensuring a reliable and good labour force?
- Any changes in origin and type of labour force (migration and employment in other states)?

Post-harvest and quality requirements

- How is the fish packaged from and to your peeling sheds (i.e. use of ice, crates/baskets)?
- How is the fish transported from and to your peeling shed?
- Have there been any changes in the way the fish is packaged/transported over the past 20 years?
- What are the basic minimum quality requirements you expect from suppliers (traders, agents, fishermen)?
- What are the basic minimum quality requirements required by processing plants/export houses?
- Have there been any changes in quality requirements from the processing plants/ export houses? If yes, in what way and why?
- Do you find it difficult to meet these quality requirements? If yes, why? Do you feel these requirements are unrealistic?
- Do you get advice/extension about quality issues? If yes, by whom and what type of advice? (Example)
- Do you feel the level of advice/extension is sufficient?
- Are you aware of Indian legislation about quality and food safety? If yes, what does it stipulate?
- What do you know about international legislation? Are there any differences in quality requirements from Japan, USA and Europe? If yes, in what way and how does it affect your business?
- Have there been any changes in their requirements? If yes, in what way and how has it affected your business?

Institutional context

- Is there a peeling shed owners' association? If yes, how active? What are the objectives and activities? Are you a member?
- Are there any regulations as stipulated by government for operating a peeling shed?
- Do you need to be registered with any government institutions, i.e. MPEDA? If yes, are you registered? If not, why not?
- Did you face any problems in registering with MPEDA?
- Has the process of registration with MPEDA become more or less stringent in the past years? If more, why?
- Do you need to pay for registration?
- Do you have regular inspections? If yes, by whom? What do they look for and recommend?
- What do you think of the inspections (impractical/practical)?
- When was the last time your plant was inspected?
- Have there been any changes in inspection procedures/frequencies?

Problems and perceptions

- Has the number of peeling sheds in your area changed, increased, decreased, amalgamated or remained the same? If increased, how and how does it affect your business? If decreased, how and did it affect your business?
- Are processing plants or export houses investing in peeling sheds?
- Are you planning to expand your business? If not, why not?
- What are the problems you face in your business? Which is the most important?
- Have there been any major external events that affected your business in a negative way (i.e. EU ban of fish exports from India, decline in catches)? If yes, which and how?
- In what ways have other stakeholders of the seafood industry been affected, for example, the fishermen, traders, peeling shed operators, etc.?

Step-by-step Guides for Selected Data Collection Tools

Some of the PRA-related materials are based on Theiss and Grady (1991).

Box A6: Steps to consider for semi-structured interviewing

Before the survey

- Select multi-disciplinary survey team.
- Analyse secondary data.
- Prepare checklist for the interview. This should be a team exercise.
- Prepare the logistical side of the survey.
- Inform villagers through NGO or government extension officers that you are coming.
- Establish note-taking procedures within the group before you enter the village.
- Decide whether a group discussion or individual in-depth interviews are more appropriate.

During the meeting

- Be aware of the local culture and language.
- Respect villagers as equal partners. Listen to what they have to say.
- Do not use the checklist as a questionnaire but as a means of stimulating discussion and participatory dialogue.
- Build the questions to be asked around a list of sub-topics, existing information on the community, or visual material such as diagrams, photographs or maps.
- Use the 'six little helpers' for probing – who? why? what? when? where? how?
- Take notes during the interview but make sure this is not overdone. Sometimes it is better to complete notes immediately after the discussions.

After the meeting

- Finish the meeting politely.
- Have evening brain-storming sessions with the team to complete your notes and to prepare the following day.
- Establish report-writing procedures with the team. Make sure enough time is allocated.

Box A7: Steps to consider for ranking by scoring

Write each constraint on a piece of card, or use a symbol to represent it.

Shuffle the cards.

Explain to the participants that you want them to assess the severity of each constraint in turn and to give it a score.

A score of 10 means the constraint is very severe and a score of 1 means it is not very serious.

Use stones, beads, beans or anything else convenient to mark the scores.

Lay the first card on the ground and ask the group to give it a score (give them the stones, etc.).

Make sure everyone understands and that the scoring is not dominated by one or two of the participants.

Go through all the cards in turn scoring each one.

When this is finished, rearrange the cards and their scores so that the highest scoring (worst) are top of the list and the least serious are at the bottom.

If two scores are the same, place the cards side by side.

Now you should review the relative positions of the constraints with the group, using the six little helpers to probe and understand.

If there is a consensus to change scores, then this can be done so that at the end there is agreement as to prioritization.

Box A8: Steps to consider for mapping

The purpose of the map must be carefully explained to the participants.

Once the map is started, guidance should be kept to a minimum, although it may be necessary to give some assistance with the first features.

It is important to remember that the map is a tool and not simply a product. As the map emerges, features can be discussed and items on the checklist asked about.

If the map has been prepared on the ground or a blackboard, it will have to be copied when it is completed. This should be done carefully and the copy should be as exact as possible. A copy should be shown to the participants and a copy should be left with them. It is their map and experience shows that participants prefer to keep their work.

Box A9: Steps to consider for wealth ranking

Make a list of all the households in the community and assign each household a number. The name of the head of the household and the number from the master list should be written on a separate card or piece of paper.

Ask a number of key informants, who have lived in the community for a long time and who know all the households, to sort the cards into piles, independently of each other, according to wealth categories in the community (using their own criteria). If the informant is not literate, read the name on the card, hand it to him, and let him choose the pile on which to place it.

Use numbered baskets or small boxes. This helps the sorter to remember which is which and makes it easier to record the scores without mixing the baskets. Shuffle the cards between sortings so that each sorter starts with a random pile of unsorted cards.

After sorting, ask the informant what wealth criteria he chose for each pile and what the differences are between the piles. Assure the sorters of confidentiality and, to avoid bad feelings within the community, do not discuss the ranks of individual families. List local criteria and indicators derived from the ranking exercise and examine differences between informants.

When the informant has sorted all the cards into piles, record the score for each household on a score sheet according to the number of the pile. If a household cannot be placed because the family is unknown to the sorter or the sorter cannot decide to which group it belongs, leave a blank by the household's name for that informant. Ask at least three informants to sort all the households in the community independently to ensure that the results are reliable.

If the number of wealth categories used by the informants differs, divide each household's score by the number of wealth categories used by the particular sorter and multiply by 100. For example, a household in the third of five piles would receive a score of 60 (3/5 * 100 = 60). This procedure is necessary for comparing the scores of different sorters with each other (unless they all use the same number of wealth categories).

When the scores of each informant have been recorded on the form, add them and divide the total by the number of sorters. For example, if one of four sorters could not place one of the households, that household's total score is divided by three instead of four. Check the sorters' scores for consistency. If one sorter's results differ widely from the others, he may have misunderstood his instructions or reversed the baskets. In this case, disregard that sorter's scores and ask another informant to do the sorting.

Finally, arrange households according to wealth categories. If the sorters used different numbers of piles, take the average number of wealth categories (e.g. if four informants have four, four, seven and six piles, respectively, divide the community into five wealth groups). Using this system, rich households in the community will have low scores and the poorest households will have high scores.

Box A10: Steps to consider for seasonal calendars

The purpose of the exercise should be carefully explained to the participants.

The first thing to be established and drawn is the horizontal axis. This represents time and must be divided into the different seasons. In most rural societies, the seasons are not thought of as calendar months, but have their own names. These should be used for the diagram, but if seasons differ in length, then they should occupy roughly proportionate lengths on the horizontal axis.

The calendar should be drawn for more than one year, to ensure that the cyclical nature of events is correctly understood. Calendar months can be added after the calendar has been completed or after the horizontal axis is agreed.

Now the variables to be included can be placed on the calendar one by one. There are two main ways of representing variables. One is when only the timing is required, the other is when a quantitative estimate is made.

When only the timing is required, a horizontal line covering the relevant period is all that is required.

Quantitative measurement can be displayed in several ways. Continuous lines, histograms, scoring or vertical lines can be used for each season. However, quantities are always relative to one another rather than absolute and there is no scale on the vertical axis. It is often useful to ask at what time of year the variable is most evident and at which times it is least and fill in the rest of the calendar from that start.

It is important to remember that the seasonal calendar is a tool and not simply a product. Once it is completed it should be used as the basis for discussion on the variables included within it.

Seasonal calendars are easy to record. Notes on the discussions associated with them should also be made.

Box A11: Steps to consider for quantitative surveys

Decide on objectives of survey.

Identify what data are exactly needed.

Decide on target population.

Determine techniques for obtaining an unbiased sample of the target population.

Decide the statistical measures to be used, and how the results should be presented.

Prepare data recording forms/questionnaires.

Test the questionnaires.

Identify and train enumerators.

Carry out the data collection exercise; supervision is important if enumerators are to collect the data.

After the completion of fieldwork, check the questionnaires and code the responses.

Transfer the data to processing medium (i.e. computer).

Check for errors and validate data.

Carry out the actual analysis (e.g. calculation of measures, test of hypotheses).

Interpret and present the results.

The integration of wider development approaches in the fisheries sector is essential for the sector to be fully involved in the development process. **A Guide to the Analysis of Fish Marketing Systems Using a Combination of Sub-sector Analysis and the Sustainable Livelihoods Approach** discusses the main elements to be considered when analysing a fish marketing chain from a livelihoods perspective. This analysis uses both the Sustainable Livelihoods Approach and sub-sector analysis and argues that this combination of methodologies delivers the most reliable results.

Although the guide can be used for the analysis of any fish marketing chain in developing countries, the focus is on the marine fisheries sector using two DFID-funded research projects in India and Bangladesh as case studies. It is primarily aimed at researchers and development practitioners investigating fisheries-based communities or sub-sectors with the intention of preparing project interventions or policy recommendations.